

UPTOWN NEWPORT

PRELIMINARY HYDROLOGY REPORT

Prepared for:
Uptown Newport, L.P.
2 Park Plaza, Suite 700
Irvine, CA 92614
Tel: (949) 417-1396

Prepared by:

Hall & Foreman, Inc.

17782 E. 17th Street, Suite 200
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Engineering ▪ Planning ▪ Surveying



Prepared Under the Supervision of:

Two handwritten signatures are shown side-by-side. The signature on the left appears to be "Gavin" and the one on the right appears to be "Foreman".

Gavin D. Powell, P.E., LEED AP

R.C.E. 67187

Exp. Date 09/30/2012

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December, 2011
HFI Job No: II.100288.1000

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'Index Map' from Plans prepared by RBF Engineers dated 03-02-1973
 - (Existing Condition Storm Drain Infrastructure)

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Rational Method Analysis **D**

Existing Condition:

 25-Year Storm Event

- Area A
- Area B

 100-Year Storm Event

- Area A
- Area B

Developed Condition:

 25-Year Storm Event

- Area A
- Area B

 100-Year Storm Event

- Area A
- Area B

Unit Hydrograph Analysis **E**

Existing Condition:

 25-Year Storm Event

- Area A
- Area B

 100-Year Storm Event

- Area A
- Area B

Developed Condition:

 25-Year Storm Event

- Area A
- Area B

 100-Year Storm Event

- Area A
- Area B

Section 1 - Project Description:

The Uptown Newport Planned Community Development Plan (Project), hereinafter referred to as "Uptown Newport" is a planned residential community located on the north side of Jamboree Road, between MacArthur Boulevard and Birch Street, in the City of Newport Beach, California. The street address is 4311-3421 Jamboree Road. The project site is bounded by Jamboree Road to the southeast, a fast food restaurant to the northeast, and by existing office developments within the Koll Center to the northwest and southwest.

The property measures approximately 25 acres and is intended to be developed into 1,244 high-density residential units and 11,500 square feet of retail space. The project will incorporate streets, landscaping, parks, and development areas that provide a pedestrian friendly environment, with strong connectivity to adjacent commercial/office areas.

The project intends to join existing storm drain infrastructure at the downstream (northwest) side of the project. The existing storm drain infrastructure to be joined includes a 48-inch RCP and a 66-inch RCP storm drain line. These existing lines will discharge into a series of existing detention ponds before ultimately joining a 54-inch RCP storm drain system in MacArthur Boulevard. From there, storm flows continue to San Diego Creek before reaching Newport Bay and the Pacific Ocean.

The purpose of the enclosed Hydrology Study is to determine the peak flows resulting from developing the site, and provide preliminary recommendations for the storm drain system serving the Project. Recommendations will be made to maintain 'post-developed' hydrologic conditions at or below 'pre-developed' levels. Analysis will be performed for both the 25-year and 100-year storm events. Calculations are based on the methodologies outlined in the Orange County Hydrology Manual.

Section 2 - Existing (Pre-Developed) Hydrologic Conditions:

As was stated in the previous section, the proposed project site measures approximately 25-acres. The site was originally developed as part of the Koll Center, and has been used for manufacturing telecommunications equipment and computer chips since the 1970's. The property currently includes a single-story office building, and a two (2) and three (3) story semiconductor chip manufacturing facility. The remainder of the property consists of a large parking lot, drive aisle(s), and isolated areas of landscaping. Landscaped areas are estimated to represent approximately 13% of the site, leaving the remaining 87% covered by some form of impervious surface. This impervious surface distribution is consistent with the 'Commercial' land use as shown in figure C-4 of the Orange County Hydrology Manual.

Soil classification is largely comprised of 'D' type soils, a small percentage of 'B' type soils is located at the northwest tip of the project site. The reader is instructed to refer to the 'Existing Condition Hydrology Map' included in the Appendix of this report for

additional information regarding soil types and locations. The soil classification boundary limit is based on Soil Map 'B' from the Orange County Hydrology Manual.

Topography shows the site naturally drains from the southeast to the northwest end of the site. The site should be considered relatively flat with a maximum elevation drop of roughly 10-feet over a distance of approximately 650-feet.

The site currently utilizes a series of underground storm drain lines in order to provide drainage for the site. There are four (4) separate storm drain lines that ultimately connect with larger storm drain systems located in the adjacent property located to the northwest (Koll Center) of the Project site. The northernmost area of the site, which is comprised largely of a parking lot, has three (3) separate storm drain lines. These storm drain lines extend beyond the property limits and join a 66-inch RCP located within the drive aisle/parking lot of the adjacent property (Koll Center). The fourth (4th) storm drain line is a larger system that collects the storm flows from the remainder of the site. This system is further south and is ultimately taken through a 48-inch RCP storm drain before discharging into the detention pond(s) mentioned in the previous section.

The reader is advised to refer to the 'Existing Condition Hydrology Map' included in the Appendix of this report for additional information on the existing hydrologic characteristics of the site. Hydrologic calculations are also included in the Appendix.

Section 3 - Developed (Post-Developed) Hydrologic Conditions:

As was described in Section 1, the Uptown Newport Project proposes 1,244 high-density residential units and 11,500 square feet of retail space. It will also incorporate streets, landscaping, park areas, and development areas. Under the post-developed condition, it is estimated that roughly 22% of the project site is designated for landscaping or park uses, leaving the remaining 78% covered in some form of impervious surface. Because a significant portion of the proposed landscape area is represented by two (2) park areas, the 'Public Park' land use will be used to represent these areas, while the 'Commercial' land use will be used to represent the remaining areas. These land use(s) are consistent with the percentage of impervious cover shown in figure C-4 of the Orange County Hydrology Manual.

Topography under the developed condition will continue to be relatively flat. Because of the nature of the project, and the boundary conditions of the site, a series of 'bird-bath' or sump areas are proposed. This strategy will allow for minimum grades to be achieved while maintaining a relatively uniform elevation for the buildings proposed for the site. This will allow for easy access to and from buildings while providing the necessary grades to drain the site. The sump areas will be drained by catch basins and joined through a network of below ground storm drain lines.

The storm drain system under the developed condition will closely mimic that of the existing condition. Tributary areas and flow rates will be maintained relatively close to

**Uptown Newport
Preliminary Hydrology Report**

what exists today. One (1) of the three (3) connections made to the existing 66-inch RCP within the drive aisle/parking lot of the adjacent property (Koll Center) will be eliminated. The remaining connections will remain and operate much as they do today.

A summary of the peak flow and storm volumes from both the existing and developed condition is included in Section 5 of this report

Section 4 - Methodology:

Hydrologic calculations for the project were performed using CIVILCADD/CIVILDESIGN Engineering Software, Version 8.0. 'Peak Flow' and 'Time of Concentration' values for each storm event were obtained using the 'Orange County Rational Hydrology Program' option within the software.

The 'Time of Concentration' obtained from the rational method analysis was then used to generate a 'Unit Hydrograph' for each respective drainage area. The resulting 'Unit Hydrograph' was used to determine overall storm volumes for each drainage area. The 'Unit Hydrograph Analysis' is an option within the CIVILCADD/CIVILDESIGN Engineering Software previously mentioned.

Calculations were performed for both the 25-year and 100-year design storm frequencies.

Section 5 - Summary of Results:

The following section provides a summary of the results of the enclosed hydrologic analysis for the Uptown Newport Project. The reader shall refer to the Appendix included with this report for complete calculations.

Uptown Newport Peak Flow Summary						
	Existing Condition			Developed Condition		
Drainage Area	Area (acres)	25-Year (cfs)	100-Year (cfs)	Area (acres)	25-Year (cfs)	100-Year (cfs)
Area A	18.18	54.44	70.09	17.74	45.49	58.42
Area B	6.60	20.94	26.95	6.28	15.13	19.54
Total	24.78	75.38	97.04	24.02	30.36	77.96

Uptown Newport Volume Summary						
Drainage Area	Existing Condition			Developed Condition		
	Area (acres)	25-Year (ac-ft)	100-Year (ac-ft)	Area (acres)	25-Year (ac-ft)	100-Year (ac-ft)
Area A	18.18	6.3370	8.1470	17.74	5.9295	7.8281
Area B	6.60	2.2965	2.9536	6.28	1.9542	2.6866
Total	24.78	8.6335	11.1006	24.02	7.8837	10.5147

As can be seen in the above tables, a decrease in the peak flows and storm volumes is experienced as a result of developing the Uptown Newport Project. This can be attributed to the increase in pervious surface that will result from developing the Project.

It should be noted that the tributary acreage for the developed condition is slightly less than that of the existing condition. This is a result of the reconfigured parkway and entrances to the project site along Jamboree Road. The difference of 0.76-acres of tributary drainage area will consist largely of parkway/landscaped area that will sheet flow onto Jamboree Road. The increased peak flows and storm volumes of this area is considered less than significant due to the fact of the small tributary area and that it will largely be a landscaped area with a pervious surface.

Section 6 - Recommendations:

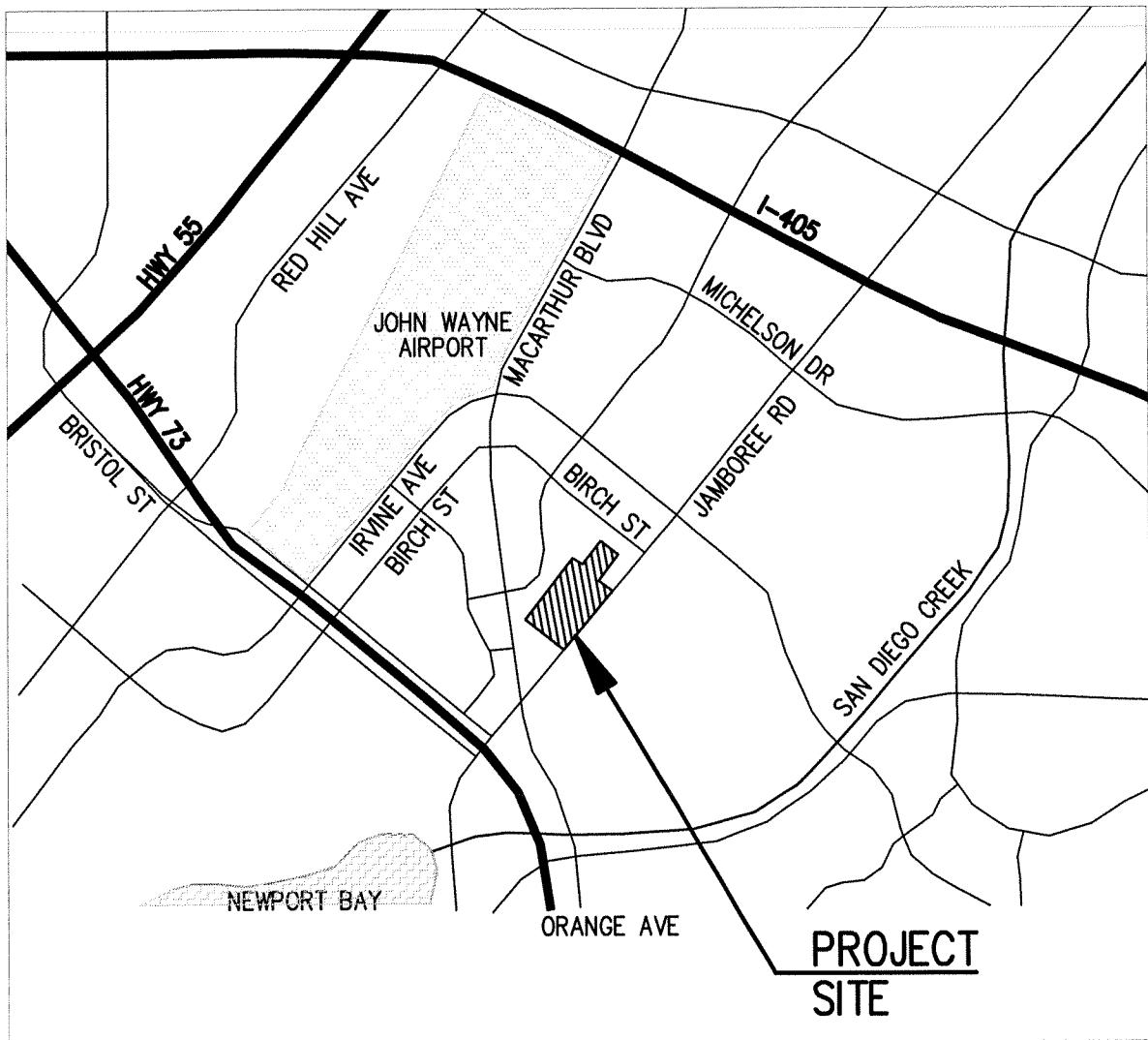
Because development of the site causes a decrease in the peak flows and storm volumes produced from the site, providing on-site mitigation is not required. Also, because the existing drainage system is being mimicked by the drainage system under the developed condition, upgrade of downstream storm drain lines is not necessary. Both the existing 66-inch RCP storm drain and the 48-inch RCP storm drain are sufficiently sized to continue receiving flows from the site after development.

As is shown on the 'Developed Condition Hydrology Map' included in the Appendix of this report, drainage areas tributary to each collection area are relatively small. While no inlet sizing calculations were performed as part of this study, based on the size of the tributary drainage areas and on sound engineering judgment, inlet and/or catch basins are anticipated to be standard size(s). Hydraulic calculations to support inlet size and location shall be refined during final engineering. Likewise, storm drain sizes are estimated by the 'Rational Method' hydrology analysis. Further refinement of storm drain sizing shall be performed during final engineering.

It is further recommended that 'Water Quality' Best Management Practices (BMP's) be implemented as indicated in the project specific Water Quality Management Plan (WQMP). Utilizing the WQMP recommendations will not only improve water quality, but will reduce maintenance operations of the storm drain system.

APPENDIX 'A'

- Vicinity Map



N.T.S.

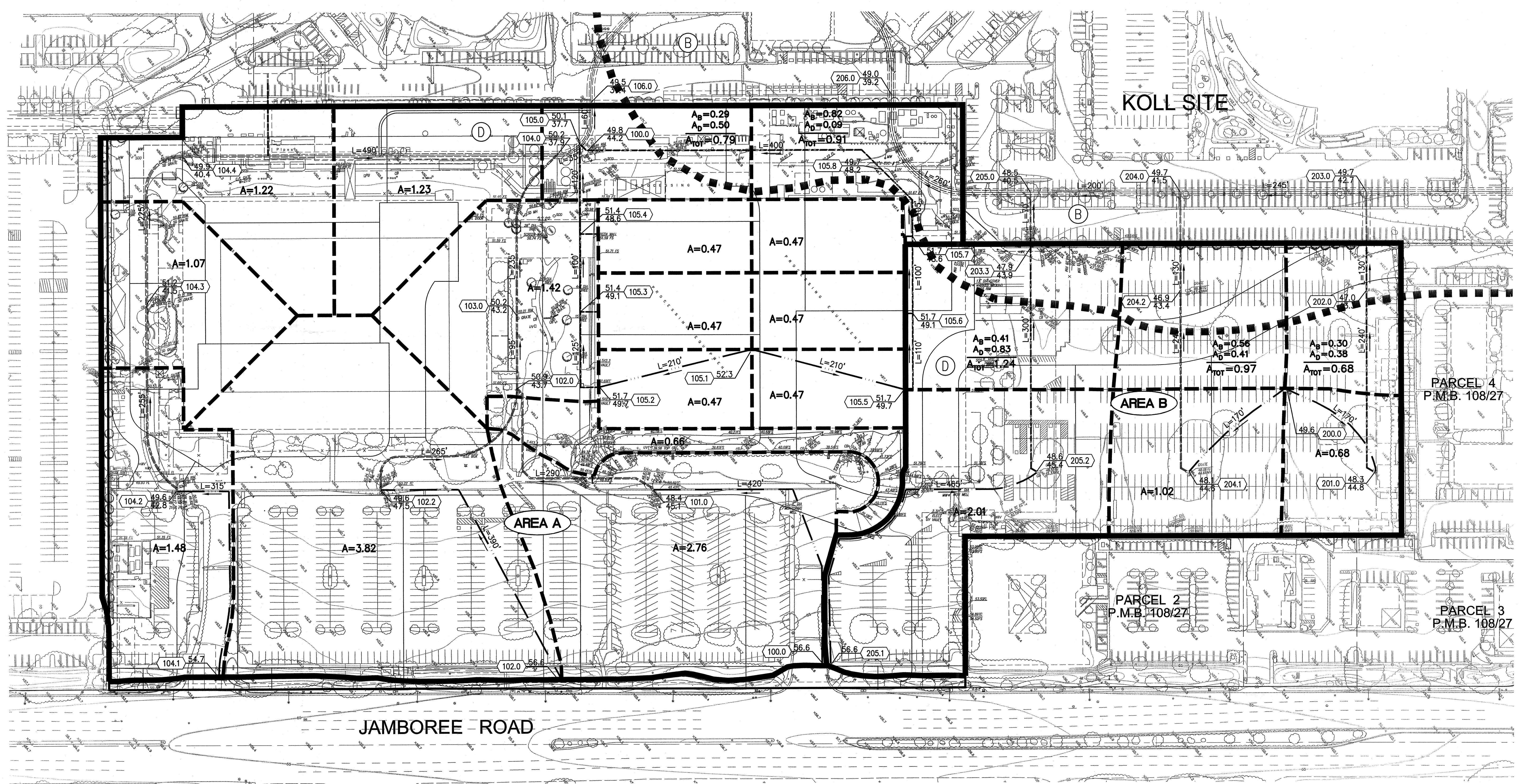
UPTOWN NEWPORT PROJECT VICINITY MAP



Job Number:
II.100288.1000
Date:
NOV. 22, 2011
Scale:
N.T.S.
Sheet 1 of
1 Sheets

APPENDIX 'B'

- Existing Condition Hydrology Map
- Developed Condition Hydrology Map



LEGEND:

100.0 1000.0 NODE POINT WITH SURFACE ELEVATION / INV. ELEVATION
995.0

A=0.28 TRIBUTARY AREA (ACRES)

A_B=0.71 TRIBUTARY AREA (ACRES) WITH SOIL DESIGNATION

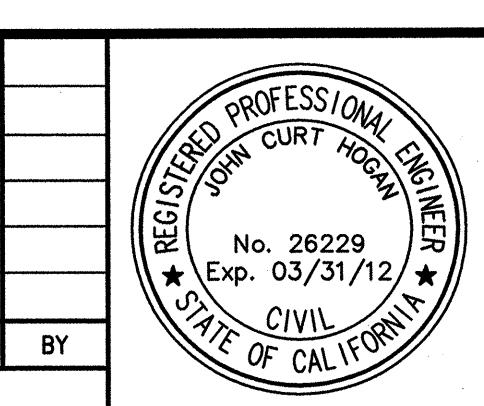
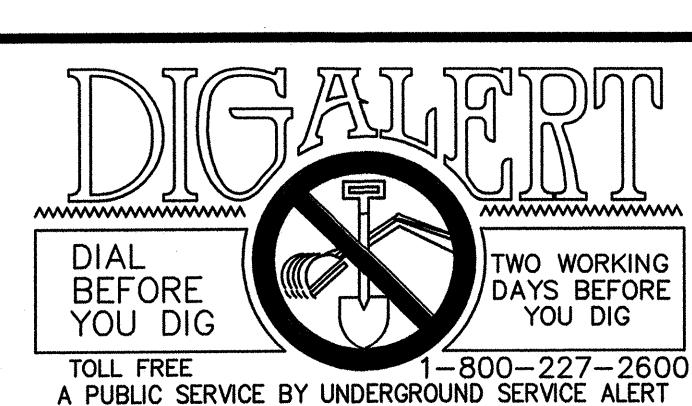
TRIBUTARY MAJOR-AREA BOUNDARY

— — — — — TRIBUTARY SUB-AREA BOUNDARY

SURFACE FLOW PATH

SOIL CLASSIFICATION BO

SOIL-SEASONATION BOUNDARY LINE



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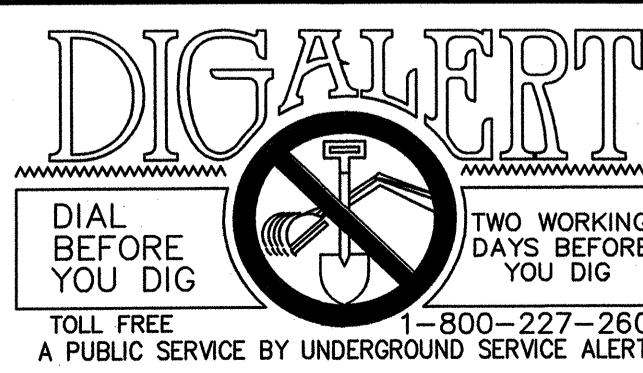
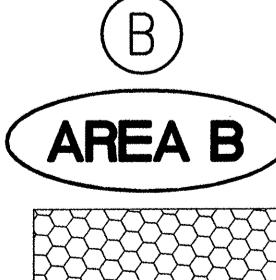
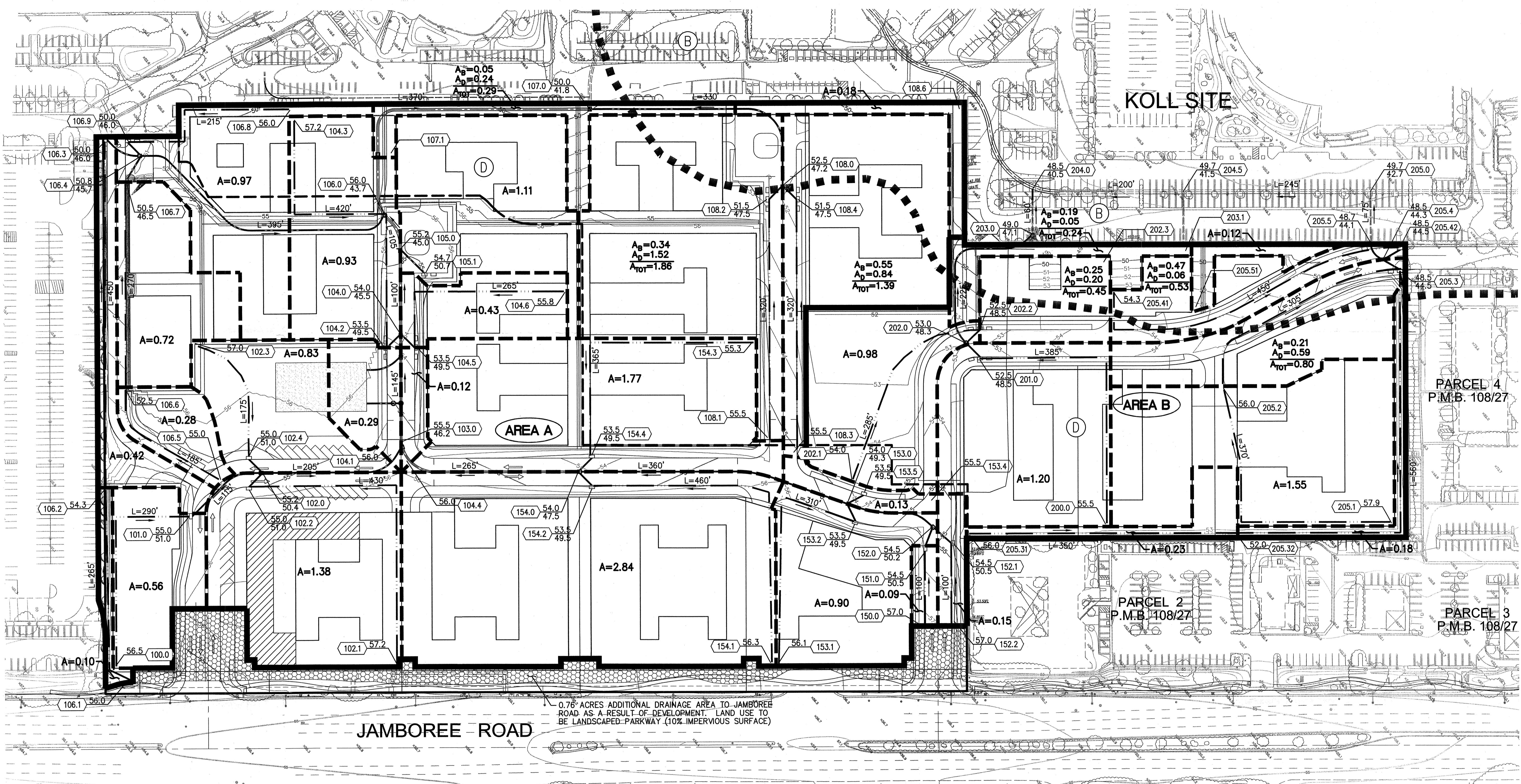
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PREPARED UNDER THE SUPERVISION OF:

JOHN C. HOGAN P.C.E. 26229 DATE:

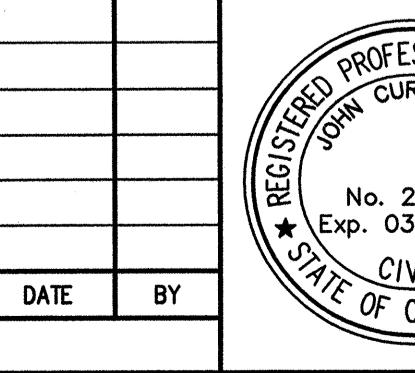
CITY OF NEWPORT BEACH
UPTOWN NEWPORT
HYDROLOGY MAP
EXISTING CONDITION

Drawing Name: S:\100288\Eng\100288-000\Hydrology Report\01-100288\01_Ex.dwg



NO.	DESCRIPTION	DATE	BY

REVISIONS



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PREPARED UNDER THE SUPERVISION OF:
JOHN C. HOGAN R.C.E. 26229 DATE:

CITY OF NEWPORT BEACH
UPTOWN NEWPORT
HYDROLOGY MAP
DEVELOPED CONDITION
DRAWN BY: GP SCALE: 1"=60'
DESIGNED BY: GP DATE: 11/15/2011
CHECKED BY: JH APPROVED BY:
CITY ENGINEER DATE:
SHT NO.: 01 OF 01

APPENDIX 'C'

Reference Documents

Orange County Hydrology Manual Reference Material

- Table B.1 - Maximum Precipitation for Indicated Duration D-Days (Inches)
- Figure B-3 - Mean Precipitation Intensities for Non-Mountainous Areas
- Table B.2 - Orange County Point Precipitation Data (inches)
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- Table C.1 - Curve Number Relationships
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- Plate B - Hydrologic Classification of Soils

'Index Map' from Plans prepared by RBF Engineers dated 03-02-1973
- (Existing Condition Storm Drain Infrastructure)

TABLE B.1
MAXIMUM PRECIPITATION FOR INDICATED DURATION D-DAYS (INCHES)

BELOW 2000' ELEVATION

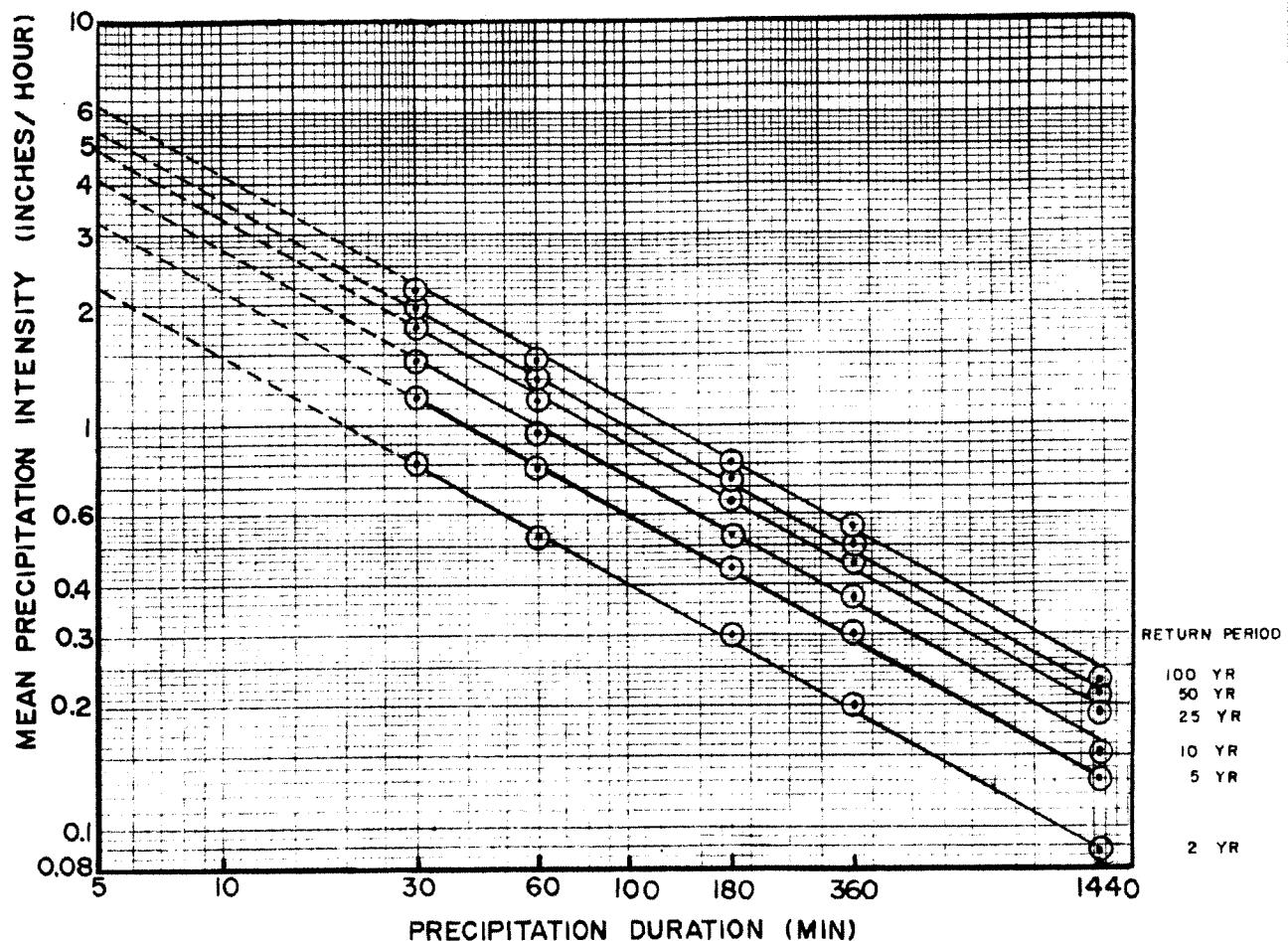
<u>Return Period</u> <u>In Yrs.</u>	<u>1D</u>	<u>2D</u>	<u>3D</u>	<u>4D</u>	<u>5D</u>	<u>6D</u>	<u>8D</u>	<u>10D</u>	<u>15D</u>	<u>20D</u>	<u>30D</u>	<u>60D</u>	<u>365D</u>
2	2.05	2.76	3.08	3.21	3.36	3.61	3.94	4.24	4.73	5.21	6.20	8.44	13.60
5	3.03	4.24	4.79	5.01	5.23	5.59	6.05	6.47	7.20	7.83	9.18	12.69	19.13
10	3.68	5.23	5.92	6.22	6.50	6.94	7.44	7.94	8.79	9.49	11.07	15.48	22.56
20	4.31	6.17	6.99	7.38	7.71	8.22	8.74	9.31	10.26	11.02	12.80	18.08	25.69
25	4.49	6.46	7.33	7.75	8.09	8.63	9.15	9.74	10.72	11.49	13.34	18.90	26.66
40	4.89	7.06	8.03	8.50	8.88	9.47	9.98	10.62	10.95	12.46	14.44	20.58	28.63
50	5.07	7.35	8.35	8.86	9.25	9.86	10.38	11.03	12.11	12.91	14.95	21.37	29.55
100	5.63	8.22	9.35	9.95	10.38	11.07	11.57	12.29	13.45	14.28	16.51	23.77	32.32

ABOVE 2000' ELEVATION

<u>Return Period</u> <u>In Yrs.</u>	<u>1D</u>	<u>2D</u>	<u>3D</u>	<u>4D</u>	<u>5D</u>	<u>6D</u>	<u>8D</u>	<u>10D</u>	<u>15D</u>	<u>20D</u>	<u>30D</u>	<u>60D</u>	<u>365D</u>
2	3.81	5.33	5.89	6.22	6.66	7.17	7.88	8.38	8.97	9.62	11.29	15.91	26.05
5	5.71	8.25	9.23	9.75	10.40	11.12	12.17	12.81	13.72	14.51	16.73	23.74	36.88
10	7.05	10.26	11.58	12.23	12.98	13.80	15.02	15.71	16.83	17.66	20.17	28.69	43.86
20	8.36	12.20	13.85	14.63	15.45	16.35	17.72	18.42	19.74	20.59	23.33	33.25	50.33
25	8.76	12.81	14.58	15.40	16.24	17.16	18.57	19.27	20.65	21.50	24.31	34.66	52.35
40	9.62	14.08	16.08	16.99	17.87	18.82	20.32	21.02	22.53	21.95	26.32	37.56	53.33
50	10.02	14.68	16.79	17.74	18.63	19.61	21.14	21.84	23.41	24.25	27.25	38.91	58.43
100	11.27	16.52	18.98	20.05	20.99	22.01	23.65	24.33	26.09	26.91	30.09	42.99	64.30

Regression Equations: $I(t) = at^b$
 (I = Intensity in inches/hour, t = duration in minutes)

Return Frequency (years)	a	b
2	5.702	-0.574
5	7.870	-0.562
10	10.209	-0.573
25	11.995	-0.566
50	13.521	-0.566
100	15.560	-0.573



B.4. UNIT HYDROGRAPH METHOD DESIGN STORM

The Orange County design storm shall be used for all unit hydrograph method calculations (Figures B-5a, b, c).

The point precipitation depths in Table B.2 shall be used for the single-day design storm.

For watersheds with detention basins, a multi-day storm shall be used as shown in Sections B.5 and B.6.

Due to the variations in point precipitation values between mountainous and nonmountainous areas, area averaging of rainfall is required when catchments include areas both above and below the 2,000-foot elevation.

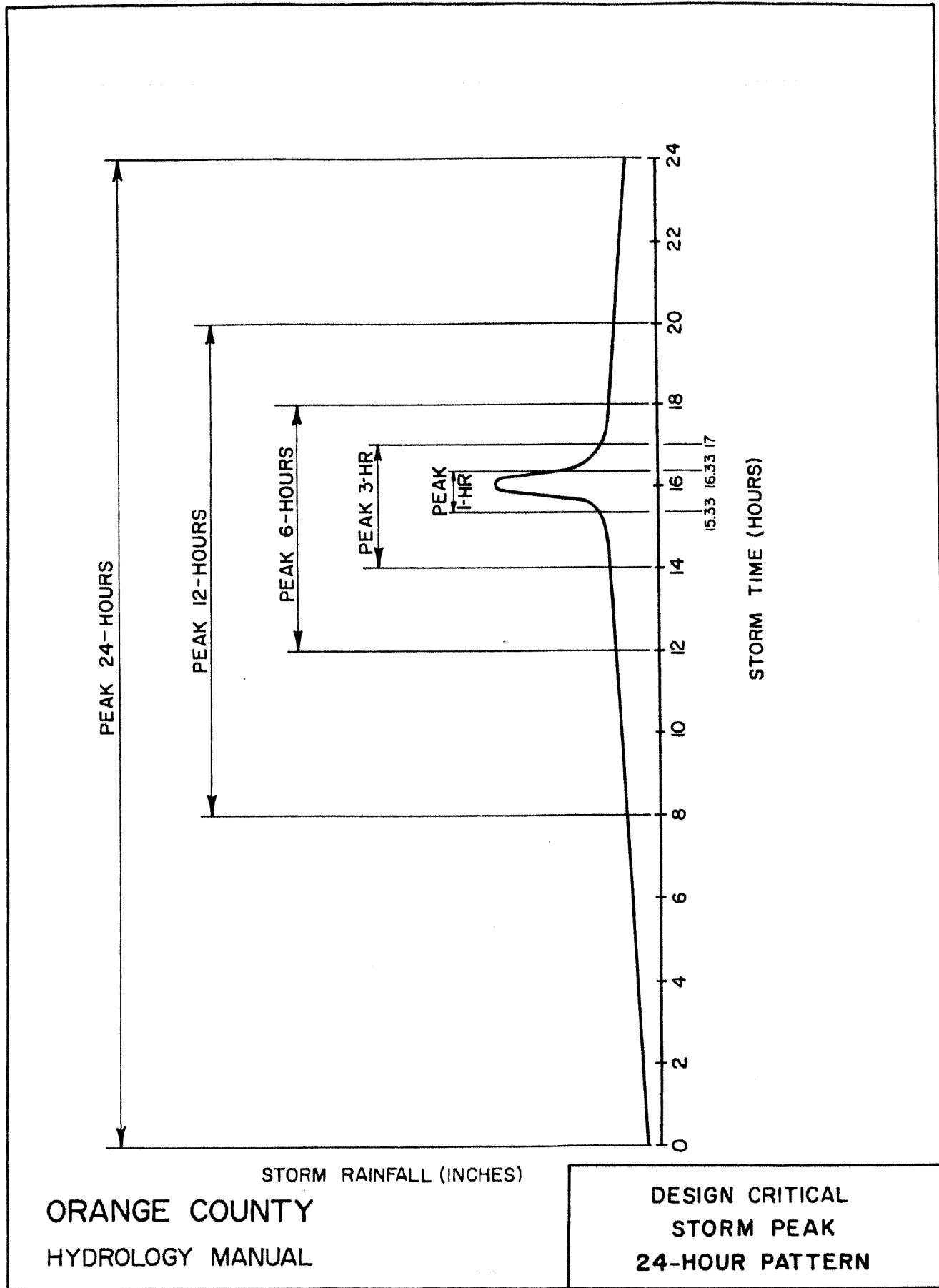
TABLE B.2.
ORANGE COUNTY POINT PRECIPITATION DATA (inches)

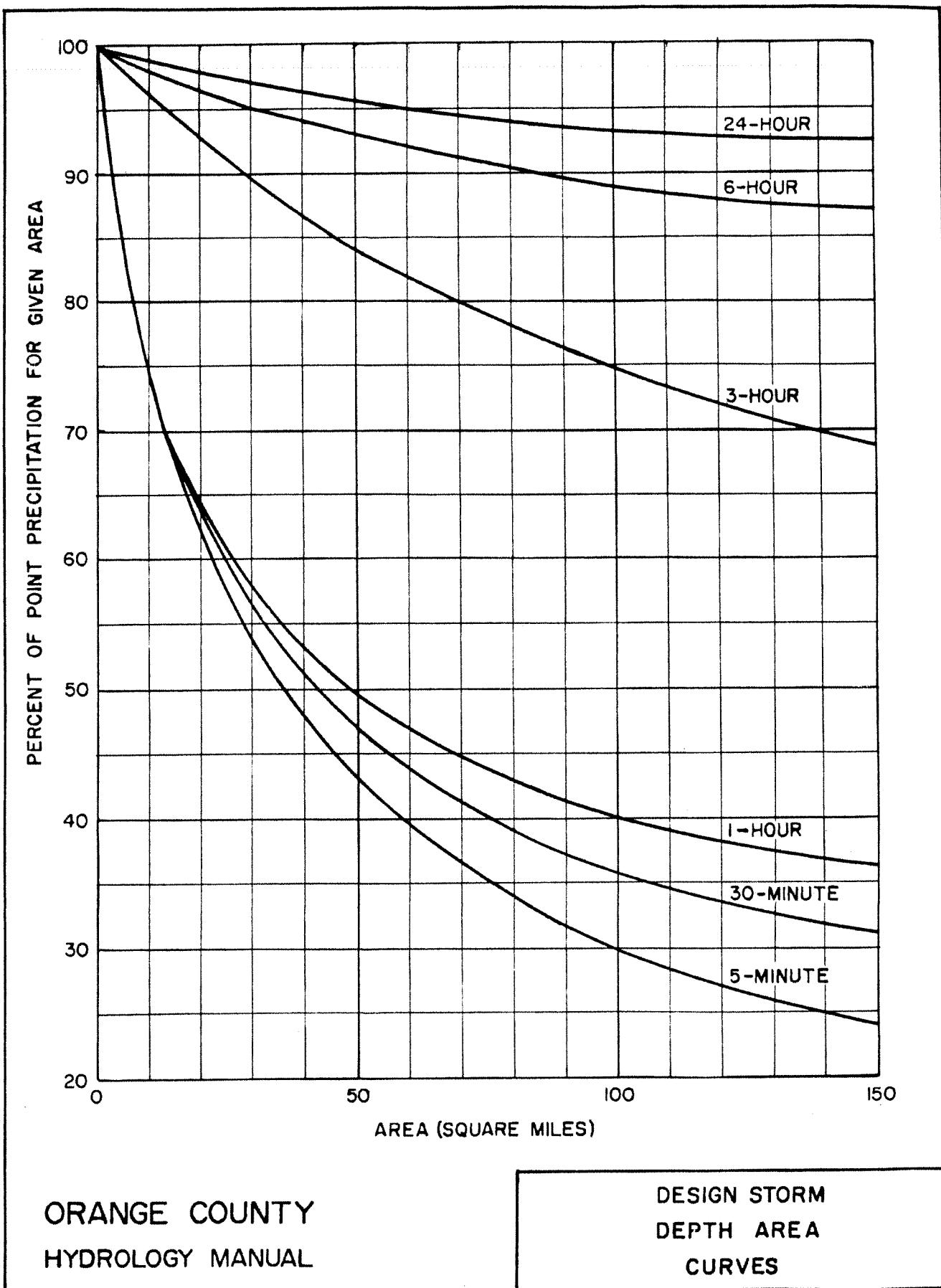
DURATION

T-YR.	5M	30M	1H	3H	6H	24H
100	0.52(.78)	1.09(1.34)	1.45(1.94)	2.43(3.96)	3.36(6.19)	5.63(11.27)
50	0.45(.71)	0.98(1.19)	1.30(1.73)	2.19(3.52)	3.02(5.51)	5.07(10.02)
25	0.40(.63)	0.87(1.04)	1.15(1.51)	1.94(3.08)	2.71(4.81)	4.49(8.76)
10	0.34(.50)	0.72(.84)	0.95(1.22)	1.59(2.48)	2.20(3.87)	3.68(7.05)
5	0.26(.40)	0.59(.68)	0.78(.99)	1.31(2.01)	1.81(3.14)	3.03(5.71)
2	0.19(.26)	0.40(.45)	0.53(.66)	0.89(1.34)	1.22(2.09)	2.05(3.81)

NOTES:

- (1.) Numbers in () are from the Santiago Peak gage station #156, DWR depth-duration-frequency table (1983). Use in areas above 2,000 feet in elevation.
- (2.) Precipitation data for nonmountainous areas taken from an average of 25 rain gages (see ref. 7). Use in areas below 2,000 feet in elevation.
- (3.) All 5M values are extrapolations (see ref. 7).
- (4.) M = minutes; H = hours.





Curve Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II					
Cover Type (3)	Quality of Cover (2)	Soil Group			
		A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)	Poor	78	86	91	93
Chaparral, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparral, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	71	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent.)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	25	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		77	86	91	94

ORANGE COUNTY
HYDROLOGY MANUAL

**CURVE NUMBERS
FOR
PERVIOUS AREAS**

Curve Numbers of Hydrologic Soil-Cover Complexes For Pervious Areas-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group			
		A	B	C	D
<u>AGRICULTURAL COVERS (Continued)</u>					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87

Notes:

1. All curve numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:

Poor-Heavily grazed, regularly burned areas, or areas of high burn potential. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.

Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.

Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See figure C-2 for definition of cover types.

4. Impervious areas are assigned curve number 98.

<u>ACTUAL IMPERVIOUS COVER</u>			
Land Use (1)	Range-Percent		Recommended Value For Average Conditions-Percent (2)
Natural or Agriculture	0	-	0
Public Park	10	-	15
School	30	-	40
Single Family Residential: (3)			
2.5 acre lots	5	-	10
1 acre lots	10	-	20
2 dwellings/acre	20	-	30
3-4 dwellings/acre	30	-	40
5-7 dwellings/acre	35	-	50
8-10 dwellings/acre	50	-	60
More than 10 dwellings/acre	65	-	80
Multiple Family Residential:			
Condominiums	45	-	65
Apartments	65	-	80
Mobile Home Park	60	-	75
Commercial, Downtown Business or Industrial	80	-	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.
2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area shall always be made, and a review of aerial photos, where available, may assist in estimating the percentage of impervious cover in developed areas.
3. For typical equestrian subdivisions increase impervious area 5 percent over the values recommended in the table above.

ORANGE COUNTY
HYDROLOGY MANUAL

**ACTUAL IMPERVIOUS COVER
FOR
DEVELOPED AREAS**

Figure C-4

purposes of design hydrology, AMC I will be used for the 2- and 5-year storm events. The watershed condition AMC II will be used for the 10-, 25-, and 50-year return frequency storms. For the case of the 100-year return frequency design storm, AMC III will be used.

C.5.1. Adjustment of Curve Numbers (CN) for AMC

The CN values selected for a particular soil cover type and quality also depend upon the AMC condition assumed. The CN values listed in Figure C-3 correspond to AMC II and require adjustment in order to represent either AMC I or AMC III. Table C.1 provides the necessary CN adjustments to account for AMC.

TABLE C.1. CURVE NUMBER RELATIONSHIPS

CN for AMC Condition II	Corresponding CN for AMC Condition	
	I	III
100	100	100
95	87	99
90	78	98
85	70	97
80	63	94
75	57	91
70	51	87
65	45	83
60	40	79
55	35	75
50	31	70
45	27	65
40	23	60
35	19	55
30	15	50
25	12	45
20	9	39
15	7	33
10	4	26
5	2	17
0	0	0

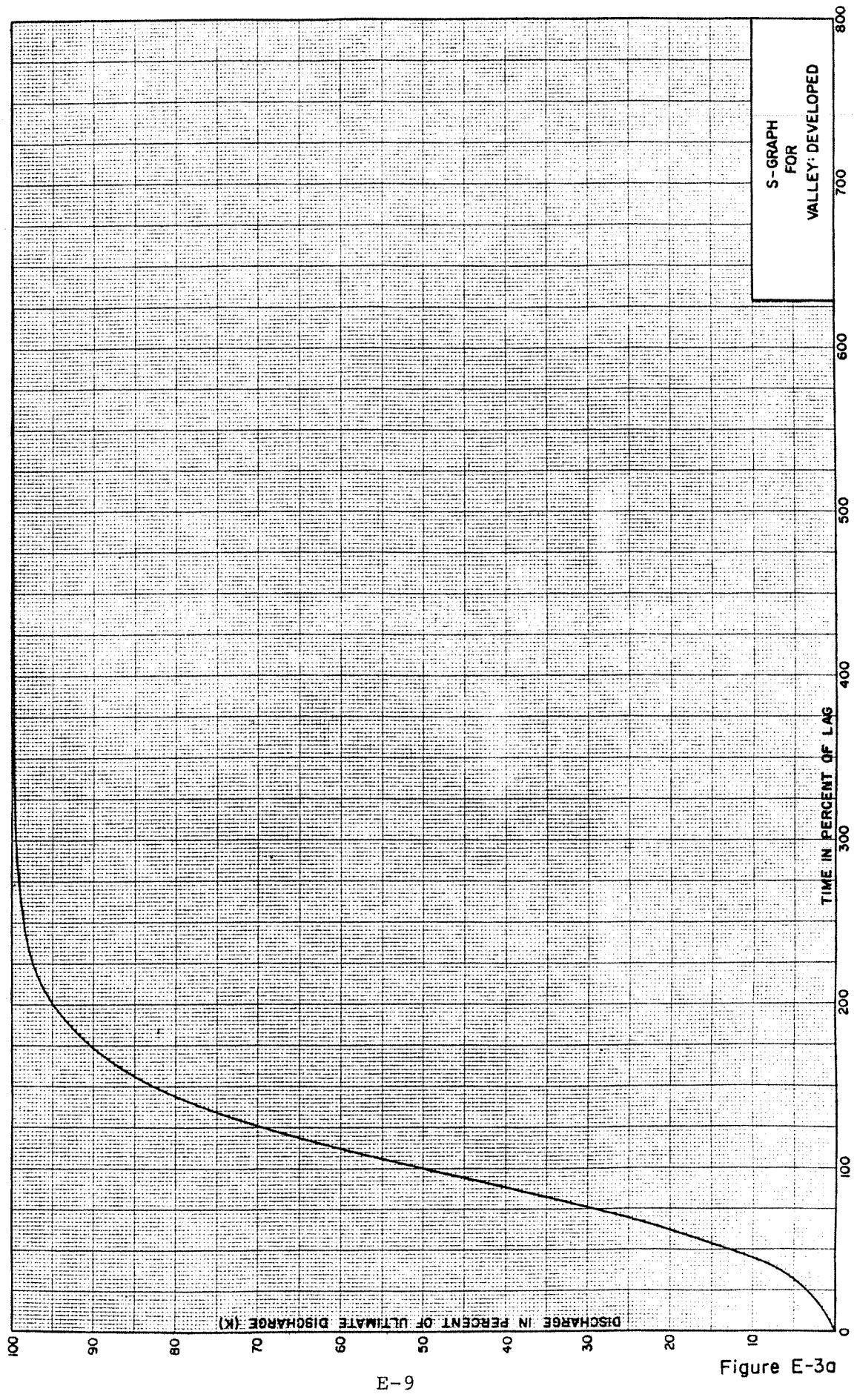
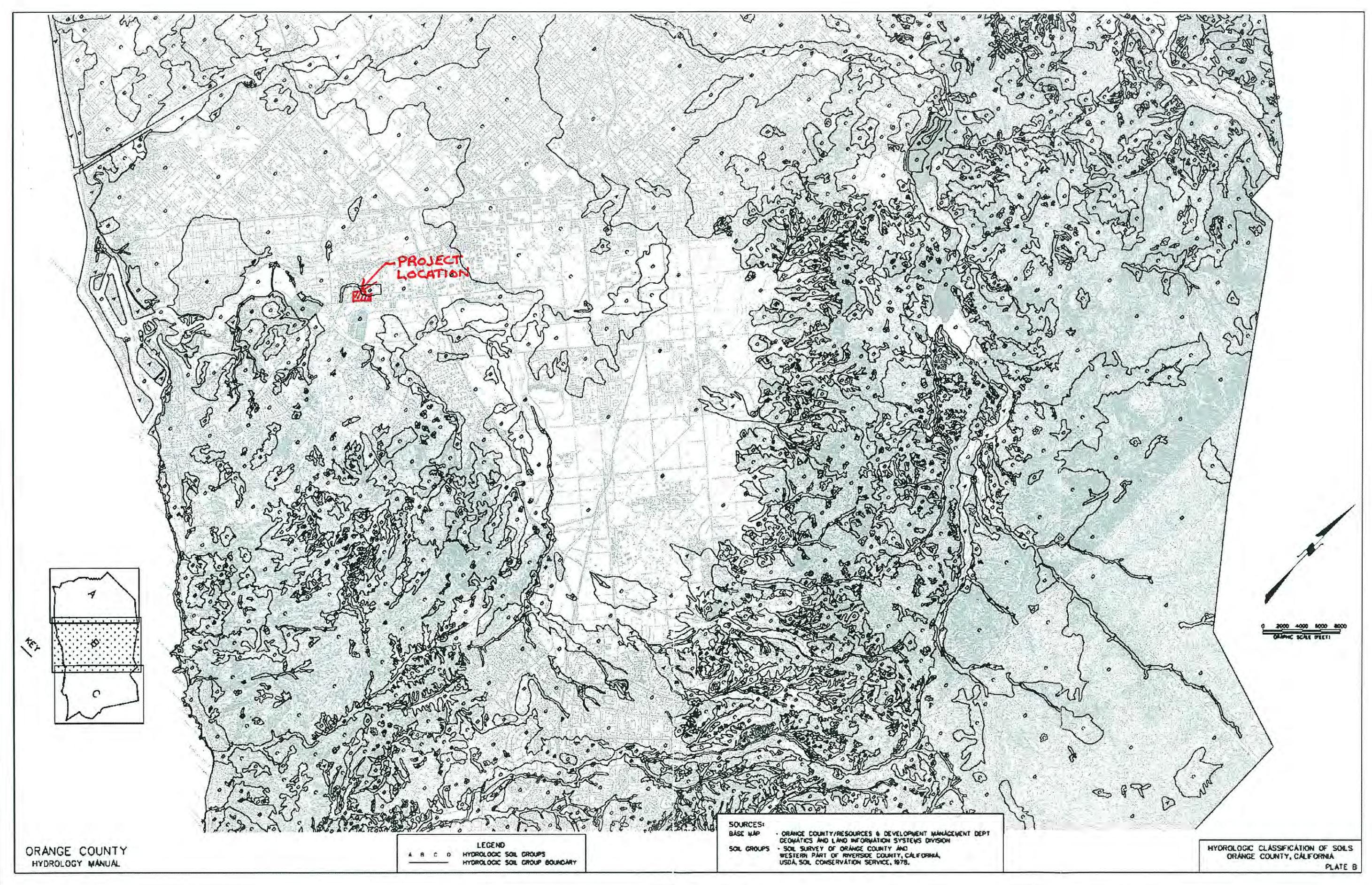
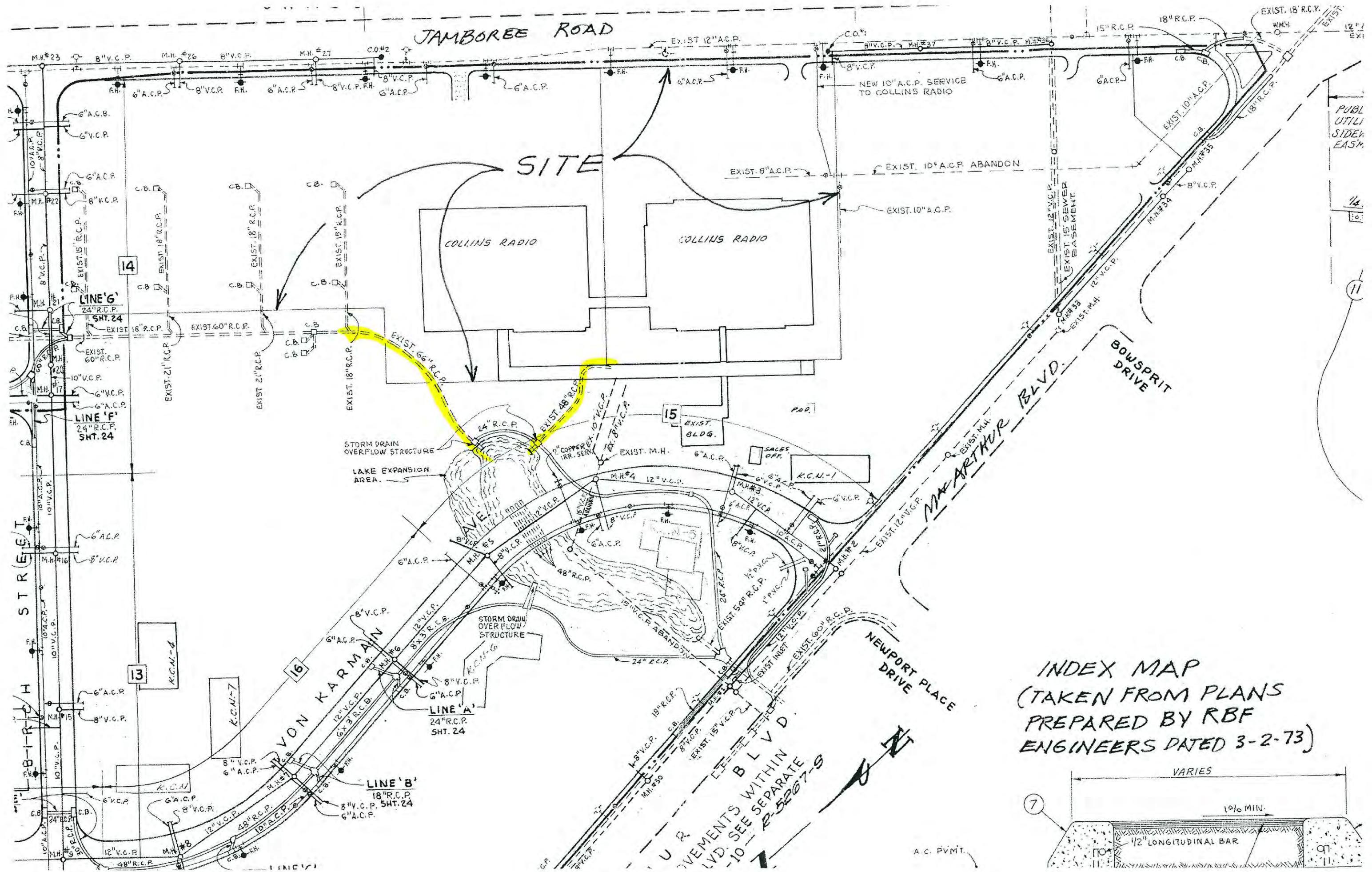


Figure E-3d

E-9





INDEX MAP
(TAKEN FROM PLANS
PREPARED BY RBF
ENGINEERS DATED 3-2-73)

APPENDIX 'D'

Rational Method Analysis

Existing Condition:

25-Year Storm Event

- Area A
- Area B

100-Year Storm Event

- Area A
- Area B

Developed Condition:

25-Year Storm Event

- Area A
- Area B

100-Year Storm Event

- Area A
- Area B

Orange County Rational Hydrology Program
(Hydrology Manual Date(s) October 1986 & November
1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2004
Version 8.0
Rational Hydrology Study, Date: 11/08/11 File Name:
100288exa25.roc

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
EXISTING CONDITION
AREA A

Program License Serial Number 4014

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 25.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

+++++
+++++ Process from Point/Station 100.000 to Point/Station
101.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 420.000 (Ft.)
Top (of initial area) elevation = 56.600 (Ft.)
Bottom (of initial area) elevation = 48.400 (Ft.)
Difference in elevation = 8.200 (Ft.)
Slope = 0.01952 s(%)= 1.95
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.483 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 3.840 (In/Hr) for a 25.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 9.488(CFS)
Total initial stream area = 2.760(Ac.)

+++++
+++ Process from Point/Station 101.000 to Point/Station
102.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 45.100(Ft.)
Downstream point/station elevation = 43.700(Ft.)
Pipe length = 290.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 9.488(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 9.488(CFS)
Normal flow depth in pipe = 15.03(In.)
Flow top width inside pipe = 18.94(In.)
Critical Depth = 13.76(In.)
Pipe flow velocity = 5.15(Ft/s)
Travel time through pipe = 0.94 min.
Time of concentration (TC) = 8.42 min.

+++++
+++ Process from Point/Station 101.000 to Point/Station
102.000 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Time of concentration = 8.42 min.
Rainfall intensity = 3.591 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.895
Subarea runoff = 1.504(CFS) for 0.660(Ac.)
Total runoff = 10.992(CFS) Total area = 3.42(Ac.)
Area averaged Fm value = 0.020 (In/Hr)

+++++
+++ Process from Point/Station 101.000 to Point/Station
102.000 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 3.420(Ac.)
Runoff from this stream = 10.992(CFS)

Time of concentration = 8.42 min.
Rainfall intensity = 3.591 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++++ Process from Point/Station 102.100 to Point/Station
102.200
***** INITIAL AREA EVALUATION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 390.000 (Ft.)
Top (of initial area) elevation = 56.600 (Ft.)
Bottom (of initial area) elevation = 49.600 (Ft.)
Difference in elevation = 7.000 (Ft.)
Slope = 0.01795 s(%) = 1.79
TC = $k(0.304) * [(length^3)/(elevation change)]^{0.2}$
Initial area time of concentration = 7.387 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 3.868 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 13.228 (CFS)
Total initial stream area = 3.820 (Ac.)

+++++
+++++ Process from Point/Station 102.200 to Point/Station
102.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 47.500 (Ft.)
Downstream point/station elevation = 43.700 (Ft.)
Pipe length = 265.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 13.228 (CFS)
Nearest computed pipe diameter = 21.00 (In.)
Calculated individual pipe flow = 13.228 (CFS)
Normal flow depth in pipe = 12.91 (In.)
Flow top width inside pipe = 20.44 (In.)
Critical Depth = 16.24 (In.)
Pipe flow velocity = 8.53 (Ft/s)
Travel time through pipe = 0.52 min.
Time of concentration (TC) = 7.91 min.

+++++
+++++ Process from Point/Station 102.200 to Point/Station

102.000

***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 3.820 (Ac.)
Runoff from this stream = 13.228 (CFS)
Time of concentration = 7.91 min.
Rainfall intensity = 3.722 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	3.42	10.992	8.42	0.020	3.591
2	3.82	13.228	7.91	0.020	3.722
Qmax(1) =					
1.000 * 1.000 * 10.992) +					
0.965 * 1.000 * 13.228) + = 23.752					
Qmax(2) =					
1.037 * 0.939 * 10.992) +					
1.000 * 1.000 * 13.228) + = 23.924					

Total of 2 streams to confluence:

Flow rates before confluence point:

10.992 13.228

Maximum flow rates at confluence using above data:

23.752 23.924

Area of streams before confluence:

3.420 3.820

Effective area values after confluence:

7.240 7.030

Results of confluence:

Total flow rate = 23.924 (CFS)

Time of concentration = 7.905 min.

Effective stream area after confluence = 7.030 (Ac.)

Study area average Pervious fraction (Ap) = 0.100

Study area average soil loss rate (Fm) = 0.020 (In/Hr)

Study area total (this main stream) = 7.24 (Ac.)

++++

Process from Point/Station 102.000 to Point/Station

103.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 43.700 (Ft.)
Downstream point/station elevation = 43.200 (Ft.)
Pipe length = 95.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 23.924 (CFS)
Nearest computed pipe diameter = 30.00 (In.)
Calculated individual pipe flow = 23.924 (CFS)
Normal flow depth in pipe = 20.37 (In.)
Flow top width inside pipe = 28.01 (In.)
Critical Depth = 19.99 (In.)
Pipe flow velocity = 6.74 (Ft/s)

Travel time through pipe = 0.23 min.
Time of concentration (TC) = 8.14 min.

+++++
**** Process from Point/Station 102.000 to Point/Station
103.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Time of concentration = 8.14 min.
Rainfall intensity = 3.661 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area,(total area with modified rational method) (Q=KCIA) is C = 0.895
Subarea runoff = 3.766 (CFS) for 1.420 (Ac.)
Total runoff = 27.690 (CFS) Total area = 8.45 (Ac.)
Area averaged Fm value = 0.020 (In/Hr)

+++++
**** Process from Point/Station 103.000 to Point/Station
104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 43.200 (Ft.)
Downstream point/station elevation = 37.900 (Ft.)
Pipe length = 235.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 27.690 (CFS)
Nearest computed pipe diameter = 24.00 (In.)
Calculated individual pipe flow = 27.690 (CFS)
Normal flow depth in pipe = 16.46 (In.)
Flow top width inside pipe = 22.28 (In.)
Critical Depth = 21.87 (In.)
Pipe flow velocity = 12.05 (Ft/s)
Travel time through pipe = 0.32 min.
Time of concentration (TC) = 8.47 min.

+++++
**** Process from Point/Station 103.000 to Point/Station
104.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 8.450 (Ac.)
Runoff from this stream = 27.690 (CFS)
Time of concentration = 8.47 min.

Rainfall intensity = 3.581 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
104.200
Process from Point/Station 104.100 to Point/Station
***** INITIAL AREA EVALUATION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil (AMC 2) = 75.00
Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 315.000 (Ft.)
Top (of initial area) elevation = 54.700 (Ft.)
Bottom (of initial area) elevation = 49.600 (Ft.)
Difference in elevation = 5.100 (Ft.)
Slope = 0.01619 s(%) = 1.62
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 6.924 min.
Rainfall intensity = 4.012 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 5.317 (CFS)
Total initial stream area = 1.480 (Ac.)

+++++
104.300
Process from Point/Station 104.200 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 42.800 (Ft.)
Downstream point/station elevation = 41.500 (Ft.)
Pipe length = 255.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.317 (CFS)
Nearest computed pipe diameter = 18.00 (In.)
Calculated individual pipe flow = 5.317 (CFS)
Normal flow depth in pipe = 11.19 (In.)
Flow top width inside pipe = 17.46 (In.)
Critical Depth = 10.66 (In.)
Pipe flow velocity = 4.60 (Ft/s)
Travel time through pipe = 0.92 min.
Time of concentration (TC) = 7.85 min.

+++++
104.300
Process from Point/Station 104.200 to Point/Station
***** SUBAREA FLOW ADDITION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Time of concentration = 7.85 min.
Rainfall intensity = 3.738 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.895
Subarea runoff = 3.215 (CFS) for 1.070 (Ac.)
Total runoff = 8.532 (CFS) Total area = 2.55 (Ac.)
Area averaged Fm value = 0.020 (In/Hr)

+++++
+++++ Process from Point/Station 104.300 to Point/Station
104.400 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 41.500 (Ft.)
Downstream point/station elevation = 40.400 (Ft.)
Pipe length = 225.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.532 (CFS)
Nearest computed pipe diameter = 21.00 (In.)
Calculated individual pipe flow = 8.532 (CFS)
Normal flow depth in pipe = 13.82 (In.)
Flow top width inside pipe = 19.92 (In.)
Critical Depth = 13.01 (In.)
Pipe flow velocity = 5.08 (Ft/s)
Travel time through pipe = 0.74 min.
Time of concentration (TC) = 8.58 min.

+++++
+++++ Process from Point/Station 104.300 to Point/Station
104.400 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Time of concentration = 8.58 min.
Rainfall intensity = 3.552 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.895
Subarea runoff = 3.453 (CFS) for 1.220 (Ac.)

Total runoff = 11.985 (CFS) Total area = 3.77 (Ac.)
Area averaged Fm value = 0.020 (In/Hr)

+++++
+++ Process from Point/Station 104.400 to Point/Station
104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 40.400 (Ft.)
Downstream point/station elevation = 37.900 (Ft.)
Pipe length = 225.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 11.985 (CFS)
Nearest computed pipe diameter = 21.00 (In.)
Calculated individual pipe flow = 11.985 (CFS)
Normal flow depth in pipe = 13.16 (In.)
Flow top width inside pipe = 20.31 (In.)
Critical Depth = 15.47 (In.)
Pipe flow velocity = 7.55 (Ft/s)
Travel time through pipe = 0.50 min.
Time of concentration (TC) = 9.08 min.

+++++
+++ Process from Point/Station 104.400 to Point/Station
104.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil (AMC 2) = 75.00
Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Time of concentration = 9.08 min.
Rainfall intensity = 3.441 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.895
Subarea runoff = 3.410 (CFS) for 1.230 (Ac.)
Total runoff = 15.395 (CFS) Total area = 5.00 (Ac.)
Area averaged Fm value = 0.020 (In/Hr)

+++++
+++ Process from Point/Station 104.400 to Point/Station
104.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 5.000 (Ac.)
Runoff from this stream = 15.395 (CFS)
Time of concentration = 9.08 min.

Rainfall intensity = 3.441 (In/Hr)
 Area averaged loss rate (Fm) = 0.0200 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	------------	-----------------	----------	------------	----------------------------

1	8.45	27.690	8.47	0.020	3.581
2	5.00	15.395	9.08	0.020	3.441
Qmax(1) = 1.000 * 1.000 * 27.690) + 1.041 * 0.932 * 15.395) + = 42.625					
Qmax(2) = 0.961 * 1.000 * 27.690) + 1.000 * 1.000 * 15.395) + = 41.999					

Total of 2 streams to confluence:
 Flow rates before confluence point:

27.690 15.395

Maximum flow rates at confluence using above data:

42.625 41.999

Area of streams before confluence:

8.450 5.000

Effective area values after confluence:

13.111 13.450

Results of confluence:

Total flow rate = 42.625 (CFS)

Time of concentration = 8.465 min.

Effective stream area after confluence = 13.111 (Ac.)

Study area average Pervious fraction (Ap) = 0.100

Study area average soil loss rate (Fm) = 0.020 (In/Hr)

Study area total (this main stream) = 13.45 (Ac.)

+++++

+++++ Process from Point/Station 104.000 to Point/Station
 105.000
 ***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 37.900 (Ft.)
 Downstream point/station elevation = 37.700 (Ft.)
 Pipe length = 35.00 (Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 42.625 (CFS)
 Nearest computed pipe diameter = 36.00 (In.)
 Calculated individual pipe flow = 42.625 (CFS)
 Normal flow depth in pipe = 25.39 (In.)
 Flow top width inside pipe = 32.83 (In.)
 Critical Depth = 25.51 (In.)
 Pipe flow velocity = 8.00 (Ft/s)
 Travel time through pipe = 0.07 min.
 Time of concentration (TC) = 8.54 min.

+++++ Process from Point/Station 104.000 to Point/Station
 105.000

***** CONFLUENCE OF MAIN STREAMS *****

The following data inside Main Stream is listed:

In Main Stream number: 1

Stream flow area = 13.111 (Ac.)

Runoff from this stream = 42,625 (CFS)

Time of concentration = 8.54 min.

Rainfall intensity = 3.563 (In/Hr)

Area averaged loss rate (Em) = 0.0200 (In/Hr)

Area averaged Pervious ratio (A_p) = 0.1000

Program is now starting with Main Stream No. 2

Program is now starting with Main Stream No. 2

ANSWER: The answer is 1000. The total number of people in the room is 1000.

Progress from Point /Station 105 100 to Point

+++++
+ Process from Point/Station 105.100 to Point/Station
105.200
+ **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 SCS curve number for soil(AMC 2) = 75.00
 Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.200 (In/Hr)
 Max Catchment Loss (F_m) = 0.020 (In/Hr)
 Initial subarea data:
 Initial area flow distance = 210.000 (Ft.)
 Top (of initial area) elevation = 52.300 (Ft.)
 Bottom (of initial area) elevation = 51.700 (Ft.)
 Difference in elevation = 0.600 (Ft.)
 Slope = 0.00286 s(%) = 0.29
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
 Initial area time of concentration = 8.329 min.
 Rainfall intensity = 3.614 (In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
 Subarea runoff = 1.520 (CFS)
 Total initial stream area = 0.470 (Ac.)

```
+-----+
+-----+
+++++ Process from Point/Station      105.200 to Point/Station
105.300
      **** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

Upstream point/station elevation = 49.700(Ft.)
Downstream point/station elevation = 49.100(Ft.)
Pipe length = 125.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.520(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 1.520(CFS)
Normal flow depth in pipe = 6.81(In.)
Flow top width inside pipe = 11.89(In.)
Critical Depth = 6.27(In.)
Pipe flow velocity = 3.30(Ft/s)
Travel time through pipe = 0.63 min.

Time of concentration (TC) = 8.96 min.

+++++
+++ Process from Point/Station 105.200 to Point/Station
105.300
**** SUBAREA FLOW ADDITION ****

— COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.200 (In/Hr)
Max Catchment Loss (F_m) = 0.020 (In/Hr)
Time of concentration = 8.96 min.
Rainfall intensity = 3.468 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) ($Q=KCIA$) is $C = 0.895$
Subarea runoff = 1.396 (CFS) for 0.470 (Ac.)
Total runoff = 2.917 (CFS) Total area = 0.94 (Ac.)
Area averaged F_m value = 0.020 (In/Hr)

+++++
+++ Process from Point/Station 105.300 to Point/Station
105.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

— Upstream point/station elevation = 49.100 (Ft.)
Downstream point/station elevation = 48.600 (Ft.)
Pipe length = 100.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.917 (CFS)
Nearest computed pipe diameter = 15.00 (In.)
Calculated individual pipe flow = 2.917 (CFS)
Normal flow depth in pipe = 8.71 (In.)
Flow top width inside pipe = 14.80 (In.)
Critical Depth = 8.24 (In.)
Pipe flow velocity = 3.95 (Ft/s)
Travel time through pipe = 0.42 min.
Time of concentration (TC) = 9.38 min.

+++++
+++ Process from Point/Station 105.300 to Point/Station
105.400
**** SUBAREA FLOW ADDITION ****

— COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000

SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p)= 0.200 (In/Hr)
Max Catchment Loss (F_m) = 0.020 (In/Hr)
Time of concentration = 9.38 min.
Rainfall intensity = 3.378 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) ($Q=KCIA$) is $C = 0.895$
Subarea runoff = 1.345 (CFS) for 0.470 (Ac.)
Total runoff = 4.262 (CFS) Total area = 1.41 (Ac.)
Area averaged F_m value = 0.020 (In/Hr)

+++++
+++++ Process from Point/Station 105.400 to Point/Station
105.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 48.600 (Ft.)
Downstream point/station elevation = 37.700 (Ft.)
Pipe length = 120.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.262 (CFS)
Nearest computed pipe diameter = 9.00 (In.)
Calculated individual pipe flow = 4.262 (CFS)
Normal flow depth in pipe = 6.40 (In.)
Flow top width inside pipe = 8.16 (In.)
Critical depth could not be calculated.
Pipe flow velocity = 12.68 (Ft/s)
Travel time through pipe = 0.16 min.
Time of concentration (TC) = 9.54 min.

+++++
+++++ Process from Point/Station 105.400 to Point/Station
105.000 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 1.410 (Ac.)
Runoff from this stream = 4.262 (CFS)
Time of concentration = 9.54 min.
Rainfall intensity = 3.347 (In/Hr)
Area averaged loss rate (F_m) = 0.0200 (In/Hr)
Area averaged Pervious ratio (A_p) = 0.1000
Program is now starting with Main Stream No. 3

+++++
+++++ Process from Point/Station 105.100 to Point/Station
105.500 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 210.000 (Ft.)
Top (of initial area) elevation = 52.300 (Ft.)
Bottom (of initial area) elevation = 51.700 (Ft.)
Difference in elevation = 0.600 (Ft.)
Slope = 0.00286 s(%) = 0.29
TC = $k(0.304) * [(\text{length}^3) / (\text{elevation change})]^{0.2}$
Initial area time of concentration = 8.329 min.
Rainfall intensity = 3.614 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 1.520 (CFS)
Total initial stream area = 0.470 (Ac.)

+++++
+++++ Process from Point/Station 105.500 to Point/Station
105.600 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.700 (Ft.)
Downstream point/station elevation = 49.100 (Ft.)
Pipe length = 110.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.520 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 1.520 (CFS)
Normal flow depth in pipe = 6.54 (In.)
Flow top width inside pipe = 11.95 (In.)
Critical Depth = 6.27 (In.)
Pipe flow velocity = 3.47 (Ft/s)
Travel time through pipe = 0.53 min.
Time of concentration (TC) = 8.86 min.

+++++
+++++ Process from Point/Station 105.500 to Point/Station
105.600 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Time of concentration = 8.86 min.
Rainfall intensity = 3.490 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with
modified rational method) (Q=KCIA) is C = 0.895

Subarea runoff = 1.416(CFS) for 0.470(Ac.)
Total runoff = 2.936(CFS) Total area = 0.94(Ac.)
Area averaged Fm value = 0.020(In/Hr)

+++++
+++++
105.700 Process from Point/Station 105.600 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 49.100(Ft.)
Downstream point/station elevation = 48.600(Ft.)
Pipe length = 100.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.936(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 2.936(CFS)
Normal flow depth in pipe = 8.75(In.)
Flow top width inside pipe = 14.79(In.)
Critical Depth = 8.26(In.)
Pipe flow velocity = 3.95(Ft/s)
Travel time through pipe = 0.42 min.
Time of concentration (TC) = 9.28 min.

+++++
+++++
105.700 Process from Point/Station 105.600 to Point/Station
***** SUBAREA FLOW ADDITION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.020(In/Hr)
Time of concentration = 9.28 min.
Rainfall intensity = 3.399(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) ($Q=KCIA$) is C = 0.895
Subarea runoff = 1.353(CFS) for 0.470(Ac.)
Total runoff = 4.288(CFS) Total area = 1.41(Ac.)
Area averaged Fm value = 0.020(In/Hr)

+++++
+++++
105.800 Process from Point/Station 105.700 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 48.600(Ft.)
Downstream point/station elevation = 46.200(Ft.)
Pipe length = 105.00(Ft.) Manning's N = 0.013

No. of pipes = 1 Required pipe flow = 4.288(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 4.288(CFS)
Normal flow depth in pipe = 8.09(In.)
Flow top width inside pipe = 11.25(In.)
Critical Depth = 10.45(In.)
Pipe flow velocity = 7.61(Ft/s)
Travel time through pipe = 0.23 min.
Time of concentration (TC) = 9.51 min.

+++++
+++ Process from Point/Station 105.700 to Point/Station
105.800 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
SCS curve number for soil(AMC 2) = 57.90
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.290 (In/Hr)
Max Catchment Loss (F_m) = 0.029 (In/Hr)
Time of concentration = 9.51 min.
Rainfall intensity = 3.353 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) ($Q=KCIA$) is $C = 0.894$
Subarea runoff = 2.663(CFS) for 0.910(Ac.)
Total runoff = 6.951(CFS) Total area = 2.32(Ac.)
Area averaged F_m value = 0.024 (In/Hr)

+++++
+++ Process from Point/Station 105.800 to Point/Station
105.900 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 46.200(Ft.)
Downstream point/station elevation = 44.200(Ft.)
Pipe length = 400.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.951(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 6.951(CFS)
Normal flow depth in pipe = 13.81(In.)
Flow top width inside pipe = 15.21(In.)
Critical Depth = 12.25(In.)
Pipe flow velocity = 4.78(Ft/s)
Travel time through pipe = 1.40 min.
Time of concentration (TC) = 10.90 min.

+++++
+++ Process from Point/Station 105.800 to Point/Station
105.900

***** SUBAREA FLOW ADDITION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.370
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.630
SCS curve number for soil(AMC 2) = 67.97
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.237 (In/Hr)
Max Catchment Loss (F_m) = 0.024 (In/Hr)
Time of concentration = 10.90 min.
Rainfall intensity = 3.103 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) ($Q=KCIA$) is $C = 0.893$
Subarea runoff = 1.667 (CFS) for 0.790 (Ac.)
Total runoff = 8.618 (CFS) Total area = 3.11 (Ac.)
Area averaged F_m value = 0.024 (In/Hr)

+++++
+++++ Process from Point/Station 105.900 to Point/Station
105.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.200 (Ft.)
Downstream point/station elevation = 37.700 (Ft.)
Pipe length = 25.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.618 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 8.618 (CFS)
Normal flow depth in pipe = 5.82 (In.)
Flow top width inside pipe = 11.99 (In.)
Critical depth could not be calculated.
Pipe flow velocity = 22.83 (Ft/s)
Travel time through pipe = 0.02 min.
Time of concentration (TC) = 10.92 min.

+++++
+++++ Process from Point/Station 105.900 to Point/Station
105.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area = 3.110 (Ac.)
Runoff from this stream = 8.618 (CFS)
Time of concentration = 10.92 min.
Rainfall intensity = 3.100 (In/Hr)
Area averaged loss rate (F_m) = 0.0236 (In/Hr)
Area averaged Pervious ratio (A_p) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	F_m (In/Hr)	Rainfall Intensity (In/Hr)
------------	------------	-----------------	----------	---------------	----------------------------

1	13.11	42.625	8.54	0.020	3.563
2	1.41	4.262	9.54	0.020	3.347
3	3.11	8.618	10.92	0.024	3.100
Qmax(1) =					
	1.000 *	1.000 *	42.625)	+	
	1.065 *	0.895 *	4.262)	+	
	1.151 *	0.782 *	8.618)	+=	54.441
Qmax(2) =					
	0.939 *	1.000 *	42.625)	+	
	1.000 *	1.000 *	4.262)	+	
	1.080 *	0.873 *	8.618)	+=	52.411
Qmax(3) =					
	0.869 *	1.000 *	42.625)	+	
	0.926 *	1.000 *	4.262)	+	
	1.000 *	1.000 *	8.618)	+=	49.612

Total of 3 main streams to confluence:

Flow rates before confluence point:

43.625	5.262	9.618
--------	-------	-------

Maximum flow rates at confluence using above data:

54.441	52.411	49.612
--------	--------	--------

Area of streams before confluence:

13.111	1.410	3.110
--------	-------	-------

Effective area values after confluence:

16.804	17.237	17.631
--------	--------	--------

Results of confluence:

Total flow rate = 54.441(CFS)

Time of concentration = 8.538 min.

Effective stream area after confluence = 16.804 (Ac.)

Study area average Pervious fraction(A_p) = 0.100

Study area average soil loss rate(F_m) = 0.021 (In/Hr)

Study area total = 17.63 (Ac.)

```
+++++
+++++ Process from Point/Station      105.000 to Point/Station
106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****
```

Upstream point/station elevation = 37.700 (Ft.)

Downstream point/station elevation = 37.400 (Ft.)

Pipe length = 60.00 (Ft.) Manning's N = 0.013

No. of pipes = 1 Required pipe flow = 54.441 (CFS)

Nearest computed pipe diameter = 39.00 (In.)

Calculated individual pipe flow = 54.441 (CFS)

Normal flow depth in pipe = 29.83 (In.)

Flow top width inside pipe = 33.08 (In.)

Critical Depth = 28.28 (In.)

Pipe flow velocity = 8.00 (Ft/s)

Travel time through pipe = 0.13 min.

Time of concentration (TC) = 8.66 min.

End of computations, total study area = 18.18 (Ac.)

The following figures may

be used for a unit hydrograph study of the same area.

Note: These figures do not consider reduced effective area

effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 0.100
Area averaged SCS curve number (AMC 2) = 73.8

Orange County Rational Hydrology Program
(Hydrology Manual Date(s) October 1986 & November
1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2004
Version 8.0
Rational Hydrology Study, Date: 11/14/11 File Name:
100288EXB25.roc

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
EXISTING CONDITION
AREA B

Program License Serial Number 4014

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 25.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

+++++
+++++ Process from Point/Station 200.000 to Point/Station
201.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 170.000 (Ft.)
Top (of initial area) elevation = 49.600 (Ft.)
Bottom (of initial area) elevation = 48.300 (Ft.)
Difference in elevation = 1.300 (Ft.)
Slope = 0.00765 s(%)= 0.76
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.286 min.
Rainfall intensity = 4.238 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 2.581 (CFS)

Total initial stream area = 0.680 (Ac.)

+++++
+++++ Process from Point/Station 201.000 to Point/Station
202.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.800 (Ft.)
Downstream point/station elevation = 43.300 (Ft.)
Pipe length = 240.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.581 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 2.581 (CFS)
Normal flow depth in pipe = 9.04 (In.)
Flow top width inside pipe = 10.35 (In.)
Critical Depth = 8.26 (In.)
Pipe flow velocity = 4.07 (Ft/s)
Travel time through pipe = 0.98 min.
Time of concentration (TC) = 7.27 min.

+++++
+++++ Process from Point/Station 201.000 to Point/Station
202.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.440
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.560
SCS curve number for soil (AMC 2) = 66.64
Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.244 (In/Hr)
Max Catchment Loss (Fm) = 0.024 (In/Hr)
Time of concentration = 7.27 min.
Rainfall intensity = 3.903 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with
modified
rational method) (Q=KCIA) is C = 0.895
Subarea runoff = 2.169 (CFS) for 0.680 (Ac.)
Total runoff = 4.750 (CFS) Total area = 1.36 (Ac.)
Area averaged Fm value = 0.022 (In/Hr)

+++++
+++++ Process from Point/Station 202.000 to Point/Station
203.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 43.300 (Ft.)
Downstream point/station elevation = 42.700 (Ft.)
Pipe length = 130.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.750 (CFS)
Nearest computed pipe diameter = 18.00 (In.)

Calculated individual pipe flow = 4.750 (CFS)
Normal flow depth in pipe = 10.73 (In.)
Flow top width inside pipe = 17.66 (In.)
Critical Depth = 10.05 (In.)
Pipe flow velocity = 4.32 (Ft/s)
Travel time through pipe = 0.50 min.
Time of concentration (TC) = 7.77 min.

+++++
+++ Process from Point/Station 203.000 to Point/Station
204.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 42.700 (Ft.)
Downstream point/station elevation = 41.500 (Ft.)
Pipe length = 245.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.750 (CFS)
Nearest computed pipe diameter = 18.00 (In.)
Calculated individual pipe flow = 4.750 (CFS)
Normal flow depth in pipe = 10.53 (In.)
Flow top width inside pipe = 17.74 (In.)
Critical Depth = 10.05 (In.)
Pipe flow velocity = 4.42 (Ft/s)
Travel time through pipe = 0.92 min.
Time of concentration (TC) = 8.69 min.

+++++
+++ Process from Point/Station 203.000 to Point/Station
204.000 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 1.360 (Ac.)
Runoff from this stream = 4.750 (CFS)
Time of concentration = 8.69 min.
Rainfall intensity = 3.527 (In/Hr)
Area averaged loss rate (Fm) = 0.0222 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 200.000 to Point/Station
204.100 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)

Initial subarea data:
Initial area flow distance = 170.000(Ft.)
Top (of initial area) elevation = 49.600(Ft.)
Bottom (of initial area) elevation = 48.100(Ft.)
Difference in elevation = 1.500(Ft.)
Slope = 0.00882 s(%)= 0.88
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 6.108 min.
Rainfall intensity = 4.307(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 3.935(CFS)
Total initial stream area = 1.020(Ac.)

++++++

+ Process from Point/Station 204.100 to Point/Station
204.200
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.600(Ft.)
Downstream point/station elevation = 43.400(Ft.)
Pipe length = 240.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.935(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 3.935(CFS)
Normal flow depth in pipe = 10.74(In.)
Flow top width inside pipe = 13.53(In.)
Critical Depth = 9.62(In.)
Pipe flow velocity = 4.19(Ft/s)
Travel time through pipe = 0.96 min.
Time of concentration (TC) = 7.06 min.

++++++

+ Process from Point/Station 204.100 to Point/Station
204.200
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.580
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.420
SCS curve number for soil(AMC 2) = 63.98
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.258(In/Hr)
Max Catchment Loss (F_m) = 0.026(In/Hr)
Time of concentration = 7.06 min.
Rainfall intensity = 3.967(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.895
Subarea runoff = 3.128(CFS) for 0.970(Ac.)
Total runoff = 7.064(CFS) Total area = 1.99(Ac.)
Area averaged F_m value = 0.023(In/Hr)

++++++

++++
Process from Point/Station 204.200 to Point/Station
204.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 43.400(Ft.)
Downstream point/station elevation = 41.500(Ft.)
Pipe length = 130.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 7.064(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 7.064(CFS)
Normal flow depth in pipe = 11.17(In.)
Flow top width inside pipe = 13.08(In.)
Critical Depth = 12.76(In.)
Pipe flow velocity = 7.21(Ft/s)
Travel time through pipe = 0.30 min.
Time of concentration (TC) = 7.36 min.

++++++
+++++
Process from Point/Station 204.200 to Point/Station
204.000
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 1.990(Ac.)
Runoff from this stream = 7.064(CFS)
Time of concentration = 7.36 min.
Rainfall intensity = 3.874(In/Hr)
Area averaged loss rate (Fm) = 0.0228(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	1.36	4.750	8.69	0.022	3.527
2	1.99	7.064	7.36	0.023	3.874

Qmax(1) =
1.000 * 1.000 * 4.750) +
0.910 * 1.000 * 7.064) + = 11.177
Qmax(2) =
1.099 * 0.847 * 4.750) +
1.000 * 1.000 * 7.064) + = 11.486

Total of 2 streams to confluence:
Flow rates before confluence point:
4.750 7.064
Maximum flow rates at confluence using above data:
11.177 11.486
Area of streams before confluence:
1.360 1.990
Effective area values after confluence:
3.350 3.142
Results of confluence:
Total flow rate = 11.486(CFS)
Time of concentration = 7.364 min.

Effective stream area after confluence = 3.142 (Ac.)
Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.023 (In/Hr)
Study area total (this main stream) = 3.35 (Ac.)

+++++
+++++
205.000 Process from Point/Station 204.000 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 41.500 (Ft.)
Downstream point/station elevation = 40.500 (Ft.)
Pipe length = 200.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 11.486 (CFS)
Nearest computed pipe diameter = 24.00 (In.)
Calculated individual pipe flow = 11.486 (CFS)
Normal flow depth in pipe = 15.05 (In.)
Flow top width inside pipe = 23.21 (In.)
Critical Depth = 14.61 (In.)
Pipe flow velocity = 5.54 (Ft/s)
Travel time through pipe = 0.60 min.
Time of concentration (TC) = 7.97 min.

+++++
+++++
205.000 Process from Point/Station 204.000 to Point/Station
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 3.142 (Ac.)
Runoff from this stream = 11.486 (CFS)
Time of concentration = 7.97 min.
Rainfall intensity = 3.706 (In/Hr)
Area averaged loss rate (Fm) = 0.0226 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++++
205.200 Process from Point/Station 205.100 to Point/Station
***** INITIAL AREA EVALUATION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 465.000 (Ft.)
Top (of initial area) elevation = 56.600 (Ft.)

Bottom (of initial area) elevation = 48.600(Ft.)
Difference in elevation = 8.000(Ft.)
Slope = 0.01720 s(%)= 1.72
TC = $k(0.304) * [(length^3) / (\text{elevation change})]^{0.2}$
Initial area time of concentration = 7.993 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084(Ft.)
for this Development Type
Rainfall intensity = 3.699(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 6.655(CFS)
Total initial stream area = 2.010(Ac.)

+++++
+++++ Process from Point/Station 205.200 to Point/Station
205.300 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 45.400(Ft.)
Downstream point/station elevation = 43.900(Ft.)
Pipe length = 300.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.655(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 6.655(CFS)
Normal flow depth in pipe = 13.30(In.)
Flow top width inside pipe = 15.81(In.)
Critical Depth = 11.97(In.)
Pipe flow velocity = 4.75(Ft/s)
Travel time through pipe = 1.05 min.
Time of concentration (TC) = 9.05 min.

+++++
+++++ Process from Point/Station 205.200 to Point/Station
205.300 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.330
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.670
SCS curve number for soil(AMC 2) = 68.73
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.233(In/Hr)
Max Catchment Loss (Fm) = 0.023(In/Hr)
Time of concentration = 9.05 min.
Rainfall intensity = 3.449(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with
modified
rational method) (Q=KCIA) is C = 0.894
Subarea runoff = 3.371(CFS) for 1.240(Ac.)
Total runoff = 10.026(CFS) Total area = 3.25(Ac.)
Area averaged Fm value = 0.021(In/Hr)

+++++
+++++

Process from Point/Station 205.300 to Point/Station
205.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 43.900(Ft.)
Downstream point/station elevation = 40.500(Ft.)
Pipe length = 70.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 10.026(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 10.026(CFS)
Normal flow depth in pipe = 9.28(In.)
Flow top width inside pipe = 14.57(In.)
Critical Depth = 14.21(In.)
Pipe flow velocity = 12.57(Ft/s)
Travel time through pipe = 0.09 min.
Time of concentration (TC) = 9.14 min.

+++++
+++++ Process from Point/Station 205.300 to Point/Station
205.000
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 3.250(Ac.)
Runoff from this stream = 10.026(CFS)
Time of concentration = 9.14 min.
Rainfall intensity = 3.429(In/Hr)
Area averaged loss rate (Fm) = 0.0213(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	3.14	11.486	7.97	0.023	3.706
2	3.25	10.026	9.14	0.021	3.429

Qmax(1) =
1.000 * 1.000 * 11.486) +
1.081 * 0.872 * 10.026) + = 20.937
Qmax(2) =
0.925 * 1.000 * 11.486) +
1.000 * 1.000 * 10.026) + = 20.648

Total of 2 streams to confluence:
Flow rates before confluence point:
11.486 10.026
Maximum flow rates at confluence using above data:
20.937 20.648
Area of streams before confluence:
3.142 3.250
Effective area values after confluence:
5.975 6.392
Results of confluence:
Total flow rate = 20.937(CFS)
Time of concentration = 7.966 min.
Effective stream area after confluence = 5.975(Ac.)

Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.022 (In/Hr)
Study area total (this main stream) = 6.39 (Ac.)
End of computations, total study area = 6.60 (Ac.)
The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number (AMC 2) = 71.3

Orange County Rational Hydrology Program
(Hydrology Manual Date(s) October 1986 & November
1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2004
Version 8.0
Rational Hydrology Study, Date: 11/14/11 File Name:
100288EXA100.roc

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
EXISTING CONDITION
AREA A

Program License Serial Number 4014

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

+++++
+++ Process from Point/Station 100.000 to Point/Station
101.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 420.000 (Ft.)
Top (of initial area) elevation = 56.600 (Ft.)
Bottom (of initial area) elevation = 48.400 (Ft.)
Difference in elevation = 8.200 (Ft.)
Slope = 0.01952 s(%)= 1.95
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.483 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 4.911 (In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 12.149(CFS)
Total initial stream area = 2.760(Ac.)

+++++
102.000 Process from Point/Station 101.000 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 45.100(Ft.)
Downstream point/station elevation = 43.700(Ft.)
Pipe length = 290.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 12.149(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 12.149(CFS)
Normal flow depth in pipe = 15.84(In.)
Flow top width inside pipe = 22.74(In.)
Critical Depth = 15.02(In.)
Pipe flow velocity = 5.52(Ft/s)
Travel time through pipe = 0.88 min.
Time of concentration (TC) = 8.36 min.

+++++
102.000 Process from Point/Station 101.000 to Point/Station
***** SUBAREA FLOW ADDITION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.200 (In/Hr)
Max Catchment Loss (F_m) = 0.020 (In/Hr)
Time of concentration = 8.36 min.
Rainfall intensity = 4.609 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.896
Subarea runoff = 1.977(CFS) for 0.660(Ac.)
Total runoff = 14.126(CFS) Total area = 3.42(Ac.)
Area averaged F_m value = 0.020 (In/Hr)

+++++
102.000 Process from Point/Station 101.000 to Point/Station
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 3.420(Ac.)
Runoff from this stream = 14.126(CFS)

Time of concentration = 8.36 min.
Rainfall intensity = 4.609 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++++ Process from Point/Station 102.100 to Point/Station
102.200
***** INITIAL AREA EVALUATION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 390.000 (Ft.)
Top (of initial area) elevation = 56.600 (Ft.)
Bottom (of initial area) elevation = 49.600 (Ft.)
Difference in elevation = 7.000 (Ft.)
Slope = 0.01795 s(%)= 1.79
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 7.387 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 4.947 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 16.940 (CFS)
Total initial stream area = 3.820 (Ac.)

+++++
+++++ Process from Point/Station 102.200 to Point/Station
102.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 47.500 (Ft.)
Downstream point/station elevation = 43.700 (Ft.)
Pipe length = 265.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 16.940 (CFS)
Nearest computed pipe diameter = 21.00 (In.)
Calculated individual pipe flow = 16.940 (CFS)
Normal flow depth in pipe = 15.47 (In.)
Flow top width inside pipe = 18.50 (In.)
Critical Depth = 18.11 (In.)
Pipe flow velocity = 8.92 (Ft/s)
Travel time through pipe = 0.50 min.
Time of concentration (TC) = 7.88 min.

+++++
+++++ Process from Point/Station 102.200 to Point/Station

102.000

***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 3.820(Ac.)
Runoff from this stream = 16.940(CFS)
Time of concentration = 7.88 min.
Rainfall intensity = 4.767(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	3.42	14.126	8.36	0.020	4.609
2	3.82	16.940	7.88	0.020	4.767
Qmax(1) =					
	1.000 *	1.000 *	14.126) +		
	0.967 *	1.000 *	16.940) + =		30.505
Qmax(2) =					
	1.034 *	0.943 *	14.126) +		
	1.000 *	1.000 *	16.940) + =		30.719

Total of 2 streams to confluence:

Flow rates before confluence point:
14.126 16.940

Maximum flow rates at confluence using above data:

30.505 30.719

Area of streams before confluence:

3.420 3.820

Effective area values after confluence:

7.240 7.046

Results of confluence:

Total flow rate = 30.719(CFS)
Time of concentration = 7.883 min.
Effective stream area after confluence = 7.046(Ac.)
Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.020(In/Hr)
Study area total (this main stream) = 7.24(Ac.)

+++++

++++

Process from Point/Station 102.000 to Point/Station
103.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 43.700(Ft.)
Downstream point/station elevation = 43.200(Ft.)
Pipe length = 95.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 30.719(CFS)
Nearest computed pipe diameter = 33.00(In.)
Calculated individual pipe flow = 30.719(CFS)
Normal flow depth in pipe = 22.34(In.)
Flow top width inside pipe = 30.86(In.)
Critical Depth = 22.12(In.)
Pipe flow velocity = 7.18(Ft/s)

Travel time through pipe = 0.22 min.
Time of concentration (TC) = 8.10 min.

+++++
+++++ Process from Point/Station 102.000 to Point/Station
103.000
***** SUBAREA FLOW ADDITION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.200 (In/Hr)
Max Catchment Loss (F_m) = 0.020 (In/Hr)
Time of concentration = 8.10 min.
Rainfall intensity = 4.692 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with
modified
rational method) ($Q=KCIA$) is $C = 0.896$
Subarea runoff = 4.876 (CFS) for 1.420 (Ac.)
Total runoff = 35.595 (CFS) Total area = 8.47 (Ac.)
Area averaged F_m value = 0.020 (In/Hr)

+++++
+++++ Process from Point/Station 103.000 to Point/Station
104.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 43.200 (Ft.)
Downstream point/station elevation = 37.900 (Ft.)
Pipe length = 235.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 35.595 (CFS)
Nearest computed pipe diameter = 27.00 (In.)
Calculated individual pipe flow = 35.595 (CFS)
Normal flow depth in pipe = 17.70 (In.)
Flow top width inside pipe = 25.66 (In.)
Critical Depth = 24.28 (In.)
Pipe flow velocity = 12.89 (Ft/s)
Travel time through pipe = 0.30 min.
Time of concentration (TC) = 8.41 min.

+++++
+++++ Process from Point/Station 103.000 to Point/Station
104.000
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 8.466 (Ac.)
Runoff from this stream = 35.595 (CFS)
Time of concentration = 8.41 min.

Rainfall intensity = 4.594 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++++ Process from Point/Station 104.100 to Point/Station
104.200
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 315.000 (Ft.)
Top (of initial area) elevation = 54.700 (Ft.)
Bottom (of initial area) elevation = 49.600 (Ft.)
Difference in elevation = 5.100 (Ft.)
Slope = 0.01619 s(%)= 1.62
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 6.924 min.
Rainfall intensity = 5.134 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 6.812 (CFS)
Total initial stream area = 1.480 (Ac.)

+++++
+++++ Process from Point/Station 104.200 to Point/Station
104.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 42.800 (Ft.)
Downstream point/station elevation = 41.500 (Ft.)
Pipe length = 255.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.812 (CFS)
Nearest computed pipe diameter = 18.00 (In.)
Calculated individual pipe flow = 6.812 (CFS)
Normal flow depth in pipe = 13.45 (In.)
Flow top width inside pipe = 15.64 (In.)
Critical Depth = 12.12 (In.)
Pipe flow velocity = 4.81 (Ft/s)
Travel time through pipe = 0.88 min.
Time of concentration (TC) = 7.81 min.

+++++
+++++ Process from Point/Station 104.200 to Point/Station
104.300
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Time of concentration = 7.81 min.
Rainfall intensity = 4.793 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.896
Subarea runoff = 4.141 (CFS) for 1.070 (Ac.)
Total runoff = 10.954 (CFS) Total area = 2.55 (Ac.)
Area averaged Fm value = 0.020 (In/Hr)

+++++
+++++ Process from Point/Station 104.300 to Point/Station
104.400 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 41.500 (Ft.)
Downstream point/station elevation = 40.400 (Ft.)
Pipe length = 225.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 10.954 (CFS)
Nearest computed pipe diameter = 21.00 (In.)
Calculated individual pipe flow = 10.954 (CFS)
Normal flow depth in pipe = 17.00 (In.)
Flow top width inside pipe = 16.49 (In.)
Critical Depth = 14.80 (In.)
Pipe flow velocity = 5.25 (Ft/s)
Travel time through pipe = 0.71 min.
Time of concentration (TC) = 8.52 min.

+++++
+++++ Process from Point/Station 104.300 to Point/Station
104.400 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Time of concentration = 8.52 min.
Rainfall intensity = 4.558 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.896
Subarea runoff = 4.445 (CFS) for 1.220 (Ac.)

Total runoff = 15.399(CFS) Total area = 3.77(Ac.)
Area averaged Fm value = 0.020(In/Hr)

+++++
+++ Process from Point/Station 104.400 to Point/Station
104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 40.400(Ft.)
Downstream point/station elevation = 37.900(Ft.)
Pipe length = 225.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 15.399(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 15.399(CFS)
Normal flow depth in pipe = 15.90(In.)
Flow top width inside pipe = 18.01(In.)
Critical Depth = 17.41(In.)
Pipe flow velocity = 7.88(Ft/s)
Travel time through pipe = 0.48 min.
Time of concentration (TC) = 9.00 min.

+++++
+++ Process from Point/Station 104.400 to Point/Station
104.000
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.020(In/Hr)
Time of concentration = 9.00 min.
Rainfall intensity = 4.419(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) ($Q=KCIA$) is C = 0.896
Subarea runoff = 4.395(CFS) for 1.230(Ac.)
Total runoff = 19.794(CFS) Total area = 5.00(Ac.)
Area averaged Fm value = 0.020(In/Hr)

+++++
+++ Process from Point/Station 104.400 to Point/Station
104.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 5.000(Ac.)
Runoff from this stream = 19.794(CFS)
Time of concentration = 9.00 min.

Rainfall intensity = 4.419 (In/Hr)
 Area averaged loss rate (Fm) = 0.0200 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	8.47	35.595	8.41	0.020	4.594
2	5.00	19.794	9.00	0.020	4.419
Qmax(1) = 1.000 * 1.000 * 35.595) + 1.040 * 0.934 * 19.794) + = 54.827					
Qmax(2) = 0.962 * 1.000 * 35.595) + 1.000 * 1.000 * 19.794) + = 54.025					

Total of 2 streams to confluence:
 Flow rates before confluence point:

35.595 19.794

Maximum flow rates at confluence using above data:

54.827 54.025

Area of streams before confluence:

8.466 5.000

Effective area values after confluence:

13.137 13.466

Results of confluence:

Total flow rate = 54.827 (CFS)

Time of concentration = 8.407 min.

Effective stream area after confluence = 13.137 (Ac.)

Study area average Pervious fraction (Ap) = 0.100

Study area average soil loss rate (Fm) = 0.020 (In/Hr)

Study area total (this main stream) = 13.47 (Ac.)

+++++

Process from Point/Station 104.000 to Point/Station

105.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 37.900 (Ft.)
 Downstream point/station elevation = 37.700 (Ft.)
 Pipe length = 35.00 (Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 54.827 (CFS)
 Nearest computed pipe diameter = 39.00 (In.)
 Calculated individual pipe flow = 54.827 (CFS)
 Normal flow depth in pipe = 28.35 (In.)
 Flow top width inside pipe = 34.75 (In.)
 Critical Depth = 28.37 (In.)
 Pipe flow velocity = 8.49 (Ft/s)
 Travel time through pipe = 0.07 min.
 Time of concentration (TC) = 8.48 min.

+++++

Process from Point/Station 104.000 to Point/Station

105.000

***** CONFLUENCE OF MAIN STREAMS *****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 13.137(Ac.)
Runoff from this stream = 54.827(CFS)
Time of concentration = 8.48 min.
Rainfall intensity = 4.573(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Program is now starting with Main Stream No. 2

++++++
+++ Process from Point/Station 105.100 to Point/Station
105.200
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 210.000(Ft.)
Top (of initial area) elevation = 52.300(Ft.)
Bottom (of initial area) elevation = 51.700(Ft.)
Difference in elevation = 0.600(Ft.)
Slope = 0.00286 s(%)= 0.29
TC = $k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 8.329 min.
Rainfall intensity = 4.619(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 1.945(CFS)
Total initial stream area = 0.470(Ac.)

++++++
+++ Process from Point/Station 105.200 to Point/Station
105.300
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.700(Ft.)
Downstream point/station elevation = 49.100(Ft.)
Pipe length = 125.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.945(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 1.945(CFS)
Normal flow depth in pipe = 8.03(In.)
Flow top width inside pipe = 11.29(In.)
Critical Depth = 7.13(In.)
Pipe flow velocity = 3.48(Ft/s)
Travel time through pipe = 0.60 min.

Time of concentration (TC) = 8.93 min.

+++++
+++ Process from Point/Station 105.200 to Point/Station
105.300
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.200 (In/Hr)
Max Catchment Loss (F_m) = 0.020 (In/Hr)
Time of concentration = 8.93 min.
Rainfall intensity = 4.439 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) ($Q=KCIA$) is $C = 0.896$
Subarea runoff = 1.793 (CFS) for 0.470 (Ac.)
Total runoff = 3.738 (CFS) Total area = 0.94 (Ac.)
Area averaged F_m value = 0.020 (In/Hr)

+++++
+++ Process from Point/Station 105.300 to Point/Station
105.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.100 (Ft.)
Downstream point/station elevation = 48.600 (Ft.)
Pipe length = 100.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.738 (CFS)
Nearest computed pipe diameter = 15.00 (In.)
Calculated individual pipe flow = 3.738 (CFS)
Normal flow depth in pipe = 10.32 (In.)
Flow top width inside pipe = 13.90 (In.)
Critical Depth = 9.38 (In.)
Pipe flow velocity = 4.15 (Ft/s)
Travel time through pipe = 0.40 min.
Time of concentration (TC) = 9.33 min.

+++++
+++ Process from Point/Station 105.300 to Point/Station
105.400
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000

SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p)= 0.200 (In/Hr)
Max Catchment Loss (F_m) = 0.020 (In/Hr)
Time of concentration = 9.33 min.
Rainfall intensity = 4.328 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) ($Q=KCIA$) is $C = 0.896$
Subarea runoff = 1.729 (CFS) for 0.470 (Ac.)
Total runoff = 5.467 (CFS) Total area = 1.41 (Ac.)
Area averaged F_m value = 0.020 (In/Hr)

+++++
+++++ Process from Point/Station 105.400 to Point/Station
105.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 48.600 (Ft.)
Downstream point/station elevation = 37.700 (Ft.)
Pipe length = 120.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.467 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 5.467 (CFS)
Normal flow depth in pipe = 6.06 (In.)
Flow top width inside pipe = 12.00 (In.)
Critical Depth = 11.25 (In.)
Pipe flow velocity = 13.73 (Ft/s)
Travel time through pipe = 0.15 min.
Time of concentration (TC) = 9.47 min.

+++++
+++++ Process from Point/Station 105.400 to Point/Station
105.000 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 1.410 (Ac.)
Runoff from this stream = 5.467 (CFS)
Time of concentration = 9.47 min.
Rainfall intensity = 4.290 (In/Hr)
Area averaged loss rate (F_m) = 0.0200 (In/Hr)
Area averaged Pervious ratio (A_p) = 0.1000
Program is now starting with Main Stream No. 3

+++++
+++++ Process from Point/Station 105.100 to Point/Station
105.500 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 210.000 (Ft.)
Top (of initial area) elevation = 52.300 (Ft.)
Bottom (of initial area) elevation = 51.700 (Ft.)
Difference in elevation = 0.600 (Ft.)
Slope = 0.00286 s(%) = 0.29
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.329 min.
Rainfall intensity = 4.619 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 1.945 (CFS)
Total initial stream area = 0.470 (Ac.)

+++++
+++ Process from Point/Station 105.500 to Point/Station
105.600
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.700 (Ft.)
Downstream point/station elevation = 49.100 (Ft.)
Pipe length = 110.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.945 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 1.945 (CFS)
Normal flow depth in pipe = 7.68 (In.)
Flow top width inside pipe = 11.52 (In.)
Critical Depth = 7.13 (In.)
Pipe flow velocity = 3.67 (Ft/s)
Travel time through pipe = 0.50 min.
Time of concentration (TC) = 8.83 min.

+++++
+++ Process from Point/Station 105.500 to Point/Station
105.600
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Time of concentration = 8.83 min.
Rainfall intensity = 4.467 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with
modified rational method) (Q=KCIA) is C = 0.896

Subarea runoff = 1.817(CFS) for 0.470(Ac.)
Total runoff = 3.762(CFS) Total area = 0.94(Ac.)
Area averaged Fm value = 0.020(In/Hr)

+++++
+++ Process from Point/Station 105.600 to Point/Station
105.700
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.100(Ft.)
Downstream point/station elevation = 48.600(Ft.)
Pipe length = 100.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.762(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 3.762(CFS)
Normal flow depth in pipe = 10.37(In.)
Flow top width inside pipe = 13.86(In.)
Critical Depth = 9.41(In.)
Pipe flow velocity = 4.16(Ft/s)
Travel time through pipe = 0.40 min.
Time of concentration (TC) = 9.23 min.

+++++
+++ Process from Point/Station 105.600 to Point/Station
105.700
**** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.020(In/Hr)
Time of concentration = 9.23 min.
Rainfall intensity = 4.355(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) ($Q=KCIA$) is C = 0.896
Subarea runoff = 1.739(CFS) for 0.470(Ac.)
Total runoff = 5.501(CFS) Total area = 1.41(Ac.)
Area averaged Fm value = 0.020(In/Hr)

+++++
+++ Process from Point/Station 105.700 to Point/Station
105.800
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 48.600(Ft.)
Downstream point/station elevation = 46.200(Ft.)
Pipe length = 105.00(Ft.) Manning's N = 0.013

No. of pipes = 1 Required pipe flow = 5.501(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 5.501(CFS)
Normal flow depth in pipe = 8.05(In.)
Flow top width inside pipe = 14.96(In.)
Critical Depth = 11.40(In.)
Pipe flow velocity = 8.19(Ft/s)
Travel time through pipe = 0.21 min.
Time of concentration (TC) = 9.44 min.

+++++
+++++ Process from Point/Station 105.700 to Point/Station
105.800
***** SUBAREA FLOW ADDITION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.900
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.100
SCS curve number for soil(AMC 2) = 57.90
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.290 (In/Hr)
Max Catchment Loss (Fm) = 0.029 (In/Hr)
Time of concentration = 9.44 min.
Rainfall intensity = 4.298 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with
modified
rational method) (Q=KCIA) is C = 0.895
Subarea runoff = 3.424(CFS) for 0.910(Ac.)
Total runoff = 8.925(CFS) Total area = 2.32(Ac.)
Area averaged Fm value = 0.024 (In/Hr)

+++++
+++++ Process from Point/Station 105.800 to Point/Station
105.900
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 46.200(Ft.)
Downstream point/station elevation = 44.200(Ft.)
Pipe length = 400.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.925(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 8.925(CFS)
Normal flow depth in pipe = 14.16(In.)
Flow top width inside pipe = 19.68(In.)
Critical Depth = 13.32(In.)
Pipe flow velocity = 5.17(Ft/s)
Travel time through pipe = 1.29 min.
Time of concentration (TC) = 10.73 min.

+++++
+++++ Process from Point/Station 105.800 to Point/Station
105.900

***** SUBAREA FLOW ADDITION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.370
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.630
SCS curve number for soil(AMC 2) = 67.97
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.237 (In/Hr)
Max Catchment Loss (Fm) = 0.024 (In/Hr)
Time of concentration = 10.73 min.
Rainfall intensity = 3.994 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.895
Subarea runoff = 2.188 (CFS) for 0.790 (Ac.)
Total runoff = 11.114 (CFS) Total area = 3.11 (Ac.)
Area averaged Fm value = 0.024 (In/Hr)

+++++
+++++ Process from Point/Station 105.900 to Point/Station
105.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 44.200 (Ft.)
Downstream point/station elevation = 37.700 (Ft.)
Pipe length = 25.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 11.114 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 11.114 (CFS)
Normal flow depth in pipe = 6.78 (In.)
Flow top width inside pipe = 11.90 (In.)
Critical depth could not be calculated.
Pipe flow velocity = 24.29 (Ft/s)
Travel time through pipe = 0.02 min.
Time of concentration (TC) = 10.75 min.

+++++
+++++ Process from Point/Station 105.900 to Point/Station
105.000
***** CONFLUENCE OF MAIN STREAMS *****

The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area = 3.110 (Ac.)
Runoff from this stream = 11.114 (CFS)
Time of concentration = 10.75 min.
Rainfall intensity = 3.990 (In/Hr)
Area averaged loss rate (Fm) = 0.0236 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	------------	-----------------	----------	------------	----------------------------

1	13.14	54.827	8.48	0.020	4.573
2	1.41	5.467	9.47	0.020	4.290
3	3.11	11.114	10.75	0.024	3.990
Qmax(1) =					
	1.000 *	1.000 *	54.827)	+	
	1.066 *	0.895 *	5.467)	+	
	1.147 *	0.788 *	11.114)	+ =	70.091
Qmax(2) =					
	0.938 *	1.000 *	54.827)	+	
	1.000 *	1.000 *	5.467)	+	
	1.076 *	0.881 *	11.114)	+ =	67.425
Qmax(3) =					
	0.872 *	1.000 *	54.827)	+	
	0.930 *	1.000 *	5.467)	+	
	1.000 *	1.000 *	11.114)	+ =	64.014

Total of 3 main streams to confluence:

Flow rates before confluence point:

55.827 6.467 12.114

Maximum flow rates at confluence using above data:

70.091 67.425 64.014

Area of streams before confluence:

13.137 1.410 3.110

Effective area values after confluence:

16.851 17.288 17.657

Results of confluence:

Total flow rate = 70.091(CFS)

Time of concentration = 8.476 min.

Effective stream area after confluence = 16.851(Ac.)

Study area average Pervious fraction(A_p) = 0.100

Study area average soil loss rate(F_m) = 0.021(In/Hr)

Study area total = 17.66(Ac.)

+++++
+++++

Process from Point/Station 105.000 to Point/Station
106.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 37.700(Ft.)
 Downstream point/station elevation = 37.400(Ft.)
 Pipe length = 60.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 70.091(CFS)
 Nearest computed pipe diameter = 42.00(In.)
 Calculated individual pipe flow = 70.091(CFS)
 Normal flow depth in pipe = 33.88(In.)
 Flow top width inside pipe = 33.18(In.)
 Critical Depth = 31.47(In.)
 Pipe flow velocity = 8.43(Ft/s)
 Travel time through pipe = 0.12 min.
 Time of concentration (TC) = 8.59 min.
 End of computations, total study area = 18.18 (Ac.)
 The following figures may
 be used for a unit hydrograph study of the same area.
 Note: These figures do not consider reduced effective area

effects caused by confluences in the rational equation.

Area averaged pervious area fraction(A_p) = 0.100
Area averaged SCS curve number (AMC 2) = 73.8

Orange County Rational Hydrology Program
(Hydrology Manual Date(s) October 1986 & November
1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2004
Version 8.0
Rational Hydrology Study, Date: 11/14/11 File Name:
100288EXB100.roc

UPTOWN NEWPORT
HFI JOB NO. III.100288.0000
EXISTING CONDITION
AREA B

Program License Serial Number 4014

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

+++++
+++++ Process from Point/Station 200.000 to Point/Station
201.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil (AMC 2) = 75.00
Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 170.000 (Ft.)
Top (of initial area) elevation = 49.600 (Ft.)
Bottom (of initial area) elevation = 48.300 (Ft.)
Difference in elevation = 1.300 (Ft.)
Slope = 0.00765 s(%)= 0.76
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 6.286 min.
Rainfall intensity = 5.427 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.897
Subarea runoff = 3.309 (CFS)

Total initial stream area = 0.680 (Ac.)

+++++
+++++ Process from Point/Station 201.000 to Point/Station
202.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 44.800 (Ft.)
Downstream point/station elevation = 43.300 (Ft.)
Pipe length = 240.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.309 (CFS)
Nearest computed pipe diameter = 15.00 (In.)
Calculated individual pipe flow = 3.309 (CFS)
Normal flow depth in pipe = 8.79 (In.)
Flow top width inside pipe = 14.78 (In.)
Critical Depth = 8.80 (In.)
Pipe flow velocity = 4.43 (Ft/s)
Travel time through pipe = 0.90 min.
Time of concentration (TC) = 7.19 min.

+++++
+++++ Process from Point/Station 201.000 to Point/Station
202.000
***** SUBAREA FLOW ADDITION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.440
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.560
SCS curve number for soil (AMC 2) = 66.64
Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.244 (In/Hr)
Max Catchment Loss (Fm) = 0.024 (In/Hr)
Time of concentration = 7.19 min.
Rainfall intensity = 5.025 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with
modified rational method) (Q=KCIA) is C = 0.896
Subarea runoff = 2.814 (CFS) for 0.680 (Ac.)
Total runoff = 6.123 (CFS) Total area = 1.36 (Ac.)
Area averaged Fm value = 0.022 (In/Hr)

+++++
+++++ Process from Point/Station 202.000 to Point/Station
203.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 43.300 (Ft.)
Downstream point/station elevation = 42.700 (Ft.)
Pipe length = 130.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.123 (CFS)
Nearest computed pipe diameter = 18.00 (In.)

Calculated individual pipe flow = 6.123 (CFS)
Normal flow depth in pipe = 12.84 (In.)
Flow top width inside pipe = 16.28 (In.)
Critical Depth = 11.47 (In.)
Pipe flow velocity = 4.54 (Ft/s)
Travel time through pipe = 0.48 min.
Time of concentration (TC) = 7.67 min.

+++++
+++ Process from Point/Station 203.000 to Point/Station
204.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 42.700 (Ft.)
Downstream point/station elevation = 41.500 (Ft.)
Pipe length = 245.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.123 (CFS)
Nearest computed pipe diameter = 18.00 (In.)
Calculated individual pipe flow = 6.123 (CFS)
Normal flow depth in pipe = 12.55 (In.)
Flow top width inside pipe = 16.54 (In.)
Critical Depth = 11.47 (In.)
Pipe flow velocity = 4.65 (Ft/s)
Travel time through pipe = 0.88 min.
Time of concentration (TC) = 8.54 min.

+++++
+++ Process from Point/Station 203.000 to Point/Station
204.000 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 1.360 (Ac.)
Runoff from this stream = 6.123 (CFS)
Time of concentration = 8.54 min.
Rainfall intensity = 4.552 (In/Hr)
Area averaged loss rate (Fm) = 0.0222 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 200.000 to Point/Station
204.100 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)

Initial subarea data:
Initial area flow distance = 170.000(Ft.)
Top (of initial area) elevation = 49.600(Ft.)
Bottom (of initial area) elevation = 48.100(Ft.)
Difference in elevation = 1.500(Ft.)
Slope = 0.00882 s(%)= 0.88
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 6.108 min.
Rainfall intensity = 5.517(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.897
Subarea runoff = 5.046(CFS)
Total initial stream area = 1.020(Ac.)

++++++
+++ Process from Point/Station 204.100 to Point/Station
204.200 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.600(Ft.)
Downstream point/station elevation = 43.400(Ft.)
Pipe length = 240.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.046(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 5.046(CFS)
Normal flow depth in pipe = 10.88(In.)
Flow top width inside pipe = 17.60(In.)
Critical Depth = 10.36(In.)
Pipe flow velocity = 4.52(Ft/s)
Travel time through pipe = 0.89 min.
Time of concentration (TC) = 6.99 min.

++++++
+++ Process from Point/Station 204.100 to Point/Station
204.200 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.580
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.420
SCS curve number for soil(AMC 2) = 63.98
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.258(In/Hr)
Max Catchment Loss (Fm) = 0.026(In/Hr)
Time of concentration = 6.99 min.
Rainfall intensity = 5.105(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.896
Subarea runoff = 4.056(CFS) for 0.970(Ac.)
Total runoff = 9.102(CFS) Total area = 1.99(Ac.)
Area averaged Fm value = 0.023(In/Hr)

++++++

++++
Process from Point/Station 204.200 to Point/Station
204.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 43.400 (Ft.)
Downstream point/station elevation = 41.500 (Ft.)
Pipe length = 130.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 9.102 (CFS)
Nearest computed pipe diameter = 18.00 (In.)
Calculated individual pipe flow = 9.102 (CFS)
Normal flow depth in pipe = 11.27 (In.)
Flow top width inside pipe = 17.42 (In.)
Critical Depth = 13.99 (In.)
Pipe flow velocity = 7.81 (Ft/s)
Travel time through pipe = 0.28 min.
Time of concentration (TC) = 7.27 min.

++++++
+++++
Process from Point/Station 204.200 to Point/Station
204.000
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 1.990 (Ac.)
Runoff from this stream = 9.102 (CFS)
Time of concentration = 7.27 min.
Rainfall intensity = 4.993 (In/Hr)
Area averaged loss rate (Fm) = 0.0228 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	1.36	6.123	8.54	0.022	4.552
2	1.99	9.102	7.27	0.023	4.993

Qmax(1) =
1.000 * 1.000 * 6.123) +
0.911 * 1.000 * 9.102) + = 14.418
Qmax(2) =
1.097 * 0.851 * 6.123) +
1.000 * 1.000 * 9.102) + = 14.820

Total of 2 streams to confluence:
Flow rates before confluence point:
6.123 9.102
Maximum flow rates at confluence using above data:
14.418 14.820
Area of streams before confluence:
1.360 1.990
Effective area values after confluence:
3.350 3.147
Results of confluence:
Total flow rate = 14.820 (CFS)
Time of concentration = 7.271 min.

Effective stream area after confluence = 3.147 (Ac.)
Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.023 (In/Hr)
Study area total (this main stream) = 3.35 (Ac.)

+++++
+++
205.000 Process from Point/Station 204.000 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 41.500 (Ft.)
Downstream point/station elevation = 40.500 (Ft.)
Pipe length = 200.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 14.820 (CFS)
Nearest computed pipe diameter = 24.00 (In.)
Calculated individual pipe flow = 14.820 (CFS)
Normal flow depth in pipe = 18.25 (In.)
Flow top width inside pipe = 20.49 (In.)
Critical Depth = 16.65 (In.)
Pipe flow velocity = 5.78 (Ft/s)
Travel time through pipe = 0.58 min.
Time of concentration (TC) = 7.85 min.

+++++
+++
205.000 Process from Point/Station 204.000 to Point/Station
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 3.147 (Ac.)
Runoff from this stream = 14.820 (CFS)
Time of concentration = 7.85 min.
Rainfall intensity = 4.779 (In/Hr)
Area averaged loss rate (Fm) = 0.0226 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++
205.200 Process from Point/Station 205.100 to Point/Station
***** INITIAL AREA EVALUATION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 465.000 (Ft.)
Top (of initial area) elevation = 56.600 (Ft.)

Bottom (of initial area) elevation = 48.600(Ft.)
Difference in elevation = 8.000(Ft.)
Slope = 0.01720 s(%)= 1.72
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.993 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084(Ft.)
for this Development Type
Rainfall intensity = 4.729(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 8.518(CFS)
Total initial stream area = 2.010(Ac.)

+++++
+++ Process from Point/Station 205.200 to Point/Station
205.300 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 45.400(Ft.)
Downstream point/station elevation = 43.900(Ft.)
Pipe length = 300.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.518(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 8.518(CFS)
Normal flow depth in pipe = 13.70(In.)
Flow top width inside pipe = 20.00(In.)
Critical Depth = 13.01(In.)
Pipe flow velocity = 5.13(Ft/s)
Travel time through pipe = 0.98 min.
Time of concentration (TC) = 8.97 min.

+++++
+++ Process from Point/Station 205.200 to Point/Station
205.300 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.330
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.670
SCS curve number for soil(AMC 2) = 68.73
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.233(In/Hr)
Max Catchment Loss (Fm) = 0.023(In/Hr)
Time of concentration = 8.97 min.
Rainfall intensity = 4.427(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with
modified
rational method) (Q=KCIA) is C = 0.896
Subarea runoff = 4.368(CFS) for 1.240(Ac.)
Total runoff = 12.886(CFS) Total area = 3.25(Ac.)
Area averaged Fm value = 0.021(In/Hr)

+++++

Process from Point/Station 205.300 to Point/Station
205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 43.900(Ft.)
Downstream point/station elevation = 40.500(Ft.)
Pipe length = 70.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 12.886(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 12.886(CFS)
Normal flow depth in pipe = 11.18(In.)
Flow top width inside pipe = 13.07(In.)
Critical depth could not be calculated.
Pipe flow velocity = 13.14(Ft/s)
Travel time through pipe = 0.09 min.
Time of concentration (TC) = 9.06 min.

+++++
+++++ Process from Point/Station 205.300 to Point/Station
205.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 3.250(Ac.)
Runoff from this stream = 12.886(CFS)
Time of concentration = 9.06 min.
Rainfall intensity = 4.402(In/Hr)
Area averaged loss rate (Fm) = 0.0213(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	3.15	14.820	7.85	0.023	4.779
2	3.25	12.886	9.06	0.021	4.402
Qmax(1) =					
	1.000 *	1.000 *	14.820)	+	
	1.086 *	0.866 *	12.886)	+	= 26.946
Qmax(2) =					
	0.921 *	1.000 *	14.820)	+	
	1.000 *	1.000 *	12.886)	+	= 26.532

Total of 2 streams to confluence:
Flow rates before confluence point:
14.820 12.886
Maximum flow rates at confluence using above data:
26.946 26.532
Area of streams before confluence:
3.147 3.250
Effective area values after confluence:
5.963 6.397
Results of confluence:
Total flow rate = 26.946(CFS)
Time of concentration = 7.847 min.
Effective stream area after confluence = 5.963(Ac.)

Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.022 (In/Hr)
Study area total (this main stream) = 6.40 (Ac.)
End of computations, total study area = 6.60 (Ac.)

The following figures may
be used for a unit hydrograph study of the same area.
Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.100
Area averaged SCS curve number (AMC 2) = 71.3

Orange County Rational Hydrology Program
(Hydrology Manual Date(s) October 1986 & November
1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2004
Version 8.0
Rational Hydrology Study, Date: 11/14/11 File Name:
100288PRA25.roc

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
DEVELOPED CONDITION
AREA A

Program License Serial Number 4014

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 25.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

+++++
+++++ Process from Point/Station 100.000 to Point/Station
101.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Previous ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 290.000 (Ft.)
Top (of initial area) elevation = 56.500 (Ft.)
Bottom (of initial area) elevation = 55.000 (Ft.)
Difference in elevation = 1.500 (Ft.)
Slope = 0.00517 s(%)= 0.52
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.416 min.
Rainfall intensity = 3.593 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 1.801 (CFS)

Total initial stream area = 0.560 (Ac.)

+++++
+++ Process from Point/Station 101.000 to Point/Station
102.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 51.000 (Ft.)
Downstream point/station elevation = 50.400 (Ft.)
Pipe length = 115.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.801 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 1.801 (CFS)
Normal flow depth in pipe = 7.40 (In.)
Flow top width inside pipe = 11.67 (In.)
Critical Depth = 6.85 (In.)
Pipe flow velocity = 3.54 (Ft/s)
Travel time through pipe = 0.54 min.
Time of concentration (TC) = 8.96 min.

+++++
+++ Process from Point/Station 101.000 to Point/Station
102.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 0.560 (Ac.)
Runoff from this stream = 1.801 (CFS)
Time of concentration = 8.96 min.
Rainfall intensity = 3.468 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 102.100 to Point/Station
102.200
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 430.000 (Ft.)
Top (of initial area) elevation = 57.200 (Ft.)
Bottom (of initial area) elevation = 55.000 (Ft.)
Difference in elevation = 2.200 (Ft.)
Slope = 0.00512 s(%) = 0.51

TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.873 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 3.282 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 4.051 (CFS)
Total initial stream area = 1.380 (Ac.)

++++++
+++ Process from Point/Station 102.200 to Point/Station
102.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 51.000 (Ft.)
Downstream point/station elevation = 50.400 (Ft.)
Pipe length = 25.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.051 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 4.051 (CFS)
Normal flow depth in pipe = 7.64 (In.)
Flow top width inside pipe = 11.54 (In.)
Critical Depth = 10.23 (In.)
Pipe flow velocity = 7.68 (Ft/s)
Travel time through pipe = 0.05 min.
Time of concentration (TC) = 9.93 min.

++++++
+++ Process from Point/Station 102.200 to Point/Station
102.000 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 1.380 (Ac.)
Runoff from this stream = 4.051 (CFS)
Time of concentration = 9.93 min.
Rainfall intensity = 3.272 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

++++++
+++ Process from Point/Station 102.300 to Point/Station
102.400 **** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil (AMC 2) = 75.00
Pervious ratio (Ap) = 0.8500 Max loss rate (Fp) = 0.200 (In/Hr)

Max Catchment Loss (Fm) = 0.170 (In/Hr)
 Initial subarea data:
 Initial area flow distance = 175.000 (Ft.)
 Top (of initial area) elevation = 57.000 (Ft.)
 Bottom (of initial area) elevation = 55.000 (Ft.)
 Difference in elevation = 2.000 (Ft.)
 Slope = 0.01143 s(%) = 1.14
 TC = $k(0.483) * [(\text{length}^3) / (\text{elevation change})]^{0.2}$
 Initial area time of concentration = 9.323 min.
 Rainfall intensity = 3.390 (In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.855
 Subarea runoff = 2.405 (CFS)
 Total initial stream area = 0.830 (Ac.)

++++++
 ++++ Process from Point/Station 102.400 to Point/Station
 102.000
 ***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 51.000 (Ft.)
 Downstream point/station elevation = 50.400 (Ft.)
 Pipe length = 25.00 (Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 2.405 (CFS)
 Nearest computed pipe diameter = 9.00 (In.)
 Calculated individual pipe flow = 2.405 (CFS)
 Normal flow depth in pipe = 6.92 (In.)
 Flow top width inside pipe = 7.58 (In.)
 Critical Depth = 8.22 (In.)
 Pipe flow velocity = 6.59 (Ft/s)
 Travel time through pipe = 0.06 min.
 Time of concentration (TC) = 9.39 min.

++++++
 ++++ Process from Point/Station 102.400 to Point/Station
 102.000
 ***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 1 in normal stream number 3
 Stream flow area = 0.830 (Ac.)
 Runoff from this stream = 2.405 (CFS)
 Time of concentration = 9.39 min.
 Rainfall intensity = 3.377 (In/Hr)
 Area averaged loss rate (Fm) = 0.1700 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.8500
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	0.56	1.801	8.96	0.020	3.468
2	1.38	4.051	9.93	0.020	3.272
3	0.83	2.405	9.39	0.170	3.377
Qmax(1) = 1.000 * 1.000 * 1.801) +					

1.060 *	0.902 *	4.051) +	
1.028 *	0.954 *	2.405) + =	8.036
Qmax(2) =			
0.943 *	1.000 *	1.801) +	
1.000 *	1.000 *	4.051) +	
0.967 *	1.000 *	2.405) + =	8.076
Qmax(3) =			
0.974 *	1.000 *	1.801) +	
1.032 *	0.945 *	4.051) +	
1.000 *	1.000 *	2.405) + =	8.113

Total of 3 streams to confluence:

Flow rates before confluence point:

1.801	4.051	2.405
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Maximum flow rates at confluence using above data:

8.036	8.076	8.113
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Area of streams before confluence:

0.560	1.380	0.830
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Effective area values after confluence:

2.597	2.770	2.695
-------	-------	-------

Results of confluence:

Total flow rate = 8.113(CFS)

Time of concentration = 9.386 min.

Effective stream area after confluence = 2.695(Ac.)

Study area average Pervious fraction(A_p) = 0.325

Study area average soil loss rate(F_m) = 0.065(In/Hr)

Study area total (this main stream) = 2.77(Ac.)

+++++

Process from Point/Station 102.000 to Point/Station
103.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 50.400(Ft.)
 Downstream point/station elevation = 46.200(Ft.)
 Pipe length = 205.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 8.113(CFS)
 Nearest computed pipe diameter = 15.00(In.)
 Calculated individual pipe flow = 8.113(CFS)
 Normal flow depth in pipe = 10.89(In.)
 Flow top width inside pipe = 13.38(In.)
 Critical Depth = 13.44(In.)
 Pipe flow velocity = 8.50(Ft/s)
 Travel time through pipe = 0.40 min.
 Time of concentration (TC) = 9.79 min.

+++++

Process from Point/Station 102.000 to Point/Station
103.000

**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1

Stream flow area = 2.695(Ac.)

Runoff from this stream = 8.113(CFS)

Time of concentration = 9.79 min.
Rainfall intensity = 3.298 (In/Hr)
Area averaged loss rate (Fm) = 0.0649 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.3247
Program is now starting with Main Stream No. 2

+++++
+++++
151.000 Process from Point/Station 150.000 to Point/Station
***** INITIAL AREA EVALUATION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 100.000 (Ft.)
Top (of initial area) elevation = 57.000 (Ft.)
Bottom (of initial area) elevation = 54.500 (Ft.)
Difference in elevation = 2.500 (Ft.)
Slope = 0.02500 s(%)= 2.50
TC = $k(0.304)*[(length^3)/(elevation change)]^{0.2}$
Initial area time of concentration = 4.011 min.
Rainfall intensity = 5.464 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.897
Subarea runoff = 0.441(CFS)
Total initial stream area = 0.090 (Ac.)

+++++
+++++
152.000 Process from Point/Station 151.000 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 50.500 (Ft.)
Downstream point/station elevation = 50.200 (Ft.)
Pipe length = 40.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 0.441 (CFS)
Nearest computed pipe diameter = 6.00 (In.)
Calculated individual pipe flow = 0.441 (CFS)
Normal flow depth in pipe = 4.48 (In.)
Flow top width inside pipe = 5.22 (In.)
Critical Depth = 4.06 (In.)
Pipe flow velocity = 2.80 (Ft/s)
Travel time through pipe = 0.24 min.
Time of concentration (TC) = 4.25 min.

+++++
+++++
152.000 Process from Point/Station 151.000 to Point/Station

***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 0.090(Ac.)
Runoff from this stream = 0.441(CFS)
Time of concentration = 4.25 min.
Rainfall intensity = 5.289(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 152.200 to Point/Station
152.100
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 100.000(Ft.)
Top (of initial area) elevation = 57.000(Ft.)
Bottom (of initial area) elevation = 54.500(Ft.)
Difference in elevation = 2.500(Ft.)
Slope = 0.02500 s(%)= 2.50
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 4.011 min.
Rainfall intensity = 5.464(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.897
Subarea runoff = 0.735(CFS)
Total initial stream area = 0.150(Ac.)

+++++
+++ Process from Point/Station 152.100 to Point/Station
152.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 50.500(Ft.)
Downstream point/station elevation = 50.200(Ft.)
Pipe length = 45.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 0.735(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 0.735(CFS)
Normal flow depth in pipe = 4.73(In.)
Flow top width inside pipe = 8.99(In.)
Critical Depth = 4.69(In.)
Pipe flow velocity = 3.12(Ft/s)
Travel time through pipe = 0.24 min.
Time of concentration (TC) = 4.25 min.

+++++
 ++++ Process from Point/Station 152.100 to Point/Station
 152.000
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2

Stream flow area = 0.150 (Ac.)

Runoff from this stream = 0.735 (CFS)

Time of concentration = 4.25 min.

Rainfall intensity = 5.287 (In/Hr)

Area averaged loss rate (Fm) = 0.0200 (In/Hr)

Area averaged Pervious ratio (Ap) = 0.1000

Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
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1	0.09	0.441	4.25	0.020	5.289
2	0.15	0.735	4.25	0.020	5.287

$Q_{max}(1) = \frac{1.000 * 0.441}{1.000 * 0.999} = \frac{0.441}{0.735} + = 1.176$

$Q_{max}(2) = \frac{1.000 * 0.441}{1.000 * 0.999} = \frac{0.441}{0.735} + = 1.176$

Total of 2 streams to confluence:

Flow rates before confluence point:

0.441 0.735

Maximum flow rates at confluence using above data:

1.176 1.176

Area of streams before confluence:

0.090 0.150

Effective area values after confluence:

0.240 0.240

Results of confluence:

Total flow rate = 1.176 (CFS)

Time of concentration = 4.252 min.

Effective stream area after confluence = 0.240 (Ac.)

Study area average Pervious fraction (Ap) = 0.100

Study area average soil loss rate (Fm) = 0.020 (In/Hr)

Study area total (this main stream) = 0.24 (Ac.)

+++++
 ++++ Process from Point/Station 152.000 to Point/Station
 153.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 50.200 (Ft.)

Downstream point/station elevation = 49.300 (Ft.)

Pipe length = 110.00 (Ft.) Manning's N = 0.013

No. of pipes = 1 Required pipe flow = 1.176 (CFS)

Nearest computed pipe diameter = 9.00 (In.)

Calculated individual pipe flow = 1.176 (CFS)

Normal flow depth in pipe = 6.01(In.)
Flow top width inside pipe = 8.48(In.)
Critical Depth = 5.98(In.)
Pipe flow velocity = 3.75(Ft/s)
Travel time through pipe = 0.49 min.
Time of concentration (TC) = 4.74 min.

+++++
+++ Process from Point/Station 152.000 to Point/Station
153.000 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 0.240(Ac.)
Runoff from this stream = 1.176(CFS)
Time of concentration = 4.74 min.
Rainfall intensity = 4.972(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 153.100 to Point/Station
153.200 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.020(In/Hr)
Initial subarea data:
Initial area flow distance = 310.000(Ft.)
Top (of initial area) elevation = 56.100(Ft.)
Bottom (of initial area) elevation = 53.500(Ft.)
Difference in elevation = 2.600(Ft.)
Slope = 0.00839 s(%)= 0.84
TC = $k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 7.847 min.
Rainfall intensity = 3.738(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 3.011(CFS)
Total initial stream area = 0.900(Ac.)

+++++
+++ Process from Point/Station 153.200 to Point/Station
153.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.500(Ft.)

Downstream point/station elevation = . 49.300(Ft.)
Pipe length = 25.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.011(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 3.011(CFS)
Normal flow depth in pipe = 9.29(In.)
Flow top width inside pipe = 10.03(In.)
Critical Depth = 8.93(In.)
Pipe flow velocity = 4.62(Ft/s)
Travel time through pipe = 0.09 min.
Time of concentration (TC) = 7.94 min.

+++++
+++ Process from Point/Station 153.200 to Point/Station
153.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 0.900(Ac.)
Runoff from this stream = 3.011(CFS)
Time of concentration = 7.94 min.
Rainfall intensity = 3.714(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 153.400 to Point/Station
153.500
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.020(In/Hr)
Initial subarea data:
Initial area flow distance = 90.000(Ft.)
Top (of initial area) elevation = 55.500(Ft.)
Bottom (of initial area) elevation = 53.500(Ft.)
Difference in elevation = 2.000(Ft.)
Slope = 0.02222 s(%)= 2.22
TC = $k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 3.937 min.
Rainfall intensity = 5.522(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.897
Subarea runoff = 0.644(CFS)
Total initial stream area = 0.130(Ac.)

+++++
+++ Process from Point/Station 153.500 to Point/Station

153.000

***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 49.500(Ft.)
Downstream point/station elevation = 49.300(Ft.)
Pipe length = 25.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 0.644(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 0.644(CFS)
Normal flow depth in pipe = 4.15(In.)
Flow top width inside pipe = 8.97(In.)
Critical Depth = 4.37(In.)
Pipe flow velocity = 3.23(Ft/s)
Travel time through pipe = 0.13 min.
Time of concentration (TC) = 4.07 min.

+++++

Process from Point/Station 153.500 to Point/Station
153.000

***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 3
Stream flow area = 0.130(Ac.)
Runoff from this stream = 0.644(CFS)
Time of concentration = 4.07 min.
Rainfall intensity = 5.422(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	0.24	1.176	4.74	0.020	4.972
2	0.90	3.011	7.94	0.020	3.714
3	0.13	0.644	4.07	0.020	5.422

Qmax(1) =
1.000 * 1.000 * 1.176) +
1.341 * 0.597 * 3.011) +
0.917 * 1.000 * 0.644) + = 4.177

Qmax(2) =
0.746 * 1.000 * 1.176) +
1.000 * 1.000 * 3.011) +
0.684 * 1.000 * 0.644) + = 4.329

Qmax(3) =
1.091 * 0.858 * 1.176) +
1.463 * 0.512 * 3.011) +
1.000 * 1.000 * 0.644) + = 4.001

Total of 3 streams to confluence:

Flow rates before confluence point:

1.176 3.011 0.644

Maximum flow rates at confluence using above data:

4.177 4.329 4.001

Area of streams before confluence:

0.240 0.900 0.130

Effective area values after confluence:
0.908 1.270 0.797
Results of confluence:
Total flow rate = 4.329(CFS)
Time of concentration = 7.937 min.
Effective stream area after confluence = 1.270(Ac.)
Study area average Pervious fraction(A_p) = 0.100
Study area average soil loss rate(F_m) = 0.020(In/Hr)
Study area total (this main stream) = 1.27(Ac.)

+++++
+++++
154.000 Process from Point/Station 153.000 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 49.300(Ft.)
Downstream point/station elevation = 47.500(Ft.)
Pipe length = 360.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.329(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 4.329(CFS)
Normal flow depth in pipe = 11.64(In.)
Flow top width inside pipe = 12.50(In.)
Critical Depth = 10.11(In.)
Pipe flow velocity = 4.23(Ft/s)
Travel time through pipe = 1.42 min.
Time of concentration (TC) = 9.35 min.

+++++
+++++
154.000 Process from Point/Station 153.000 to Point/Station
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 1.270(Ac.)
Runoff from this stream = 4.329(CFS)
Time of concentration = 9.35 min.
Rainfall intensity = 3.384(In/Hr)
Area averaged loss rate (F_m) = 0.0200(In/Hr)
Area averaged Pervious ratio (A_p) = 0.1000

+++++
+++++
154.200 Process from Point/Station 154.100 to Point/Station
***** INITIAL AREA EVALUATION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00

Pervious ratio(Ap) = 0.1000 Max loss rate(F_p)= 0.200 (In/Hr)
Max Catchment Loss (F_m) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 460.000 (Ft.)
Top (of initial area) elevation = 56.300 (Ft.)
Bottom (of initial area) elevation = 54.000 (Ft.)
Difference in elevation = 2.300 (Ft.)
Slope = 0.00500 s(%)= 0.50
 $TC = k(0.304)*[(length^3)/(elevation change)]^{0.2}$
Initial area time of concentration = 10.190 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 3.224 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area ($Q=KCIA$) is $C = 0.894$
Subarea runoff = 8.189 (CFS)
Total initial stream area = 2.840 (Ac.)

+++++
+++++ Process from Point/Station 154.200 to Point/Station
154.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 49.500 (Ft.)
Downstream point/station elevation = 47.500 (Ft.)
Pipe length = 25.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.189 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 8.189 (CFS)
Normal flow depth in pipe = 8.21 (In.)
Flow top width inside pipe = 11.15 (In.)
Critical depth could not be calculated.
Pipe flow velocity = 14.29 (Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 10.22 min.

+++++
+++++ Process from Point/Station 154.200 to Point/Station
154.000
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 2.840 (Ac.)
Runoff from this stream = 8.189 (CFS)
Time of concentration = 10.22 min.
Rainfall intensity = 3.219 (In/Hr)
Area averaged loss rate (F_m) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++++ Process from Point/Station 154.300 to Point/Station
154.400
***** INITIAL AREA EVALUATION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 365.000 (Ft.)
Top (of initial area) elevation = 55.300 (Ft.)
Bottom (of initial area) elevation = 53.500 (Ft.)
Difference in elevation = 1.800 (Ft.)
Slope = 0.00493 s(%)= 0.49
TC = $k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 9.315 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 3.392 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 5.371 (CFS)
Total initial stream area = 1.770 (Ac.)

+++++
Process from Point/Station 154.400 to Point/Station
154.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.500 (Ft.)
Downstream point/station elevation = 47.500 (Ft.)
Pipe length = 25.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.371 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 5.371 (CFS)
Normal flow depth in pipe = 6.23 (In.)
Flow top width inside pipe = 11.99 (In.)
Critical Depth = 11.20 (In.)
Pipe flow velocity = 13.04 (Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 9.35 min.

+++++
Process from Point/Station 154.400 to Point/Station
154.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 3
Stream flow area = 1.770 (Ac.)
Runoff from this stream = 5.371 (CFS)
Time of concentration = 9.35 min.
Rainfall intensity = 3.385 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	1.27	4.329	9.35	0.020	3.384
2	2.84	8.189	10.22	0.020	3.219
3	1.77	5.371	9.35	0.020	3.385
Qmax(1) =					
	1.000 *	1.000 *	4.329)	+	
	1.052 *	0.915 *	8.189)	+	
	1.000 *	1.000 *	5.371)	+ =	17.581
Qmax(2) =					
	0.951 *	1.000 *	4.329)	+	
	1.000 *	1.000 *	8.189)	+	
	0.950 *	1.000 *	5.371)	+ =	17.410
Qmax(3) =					
	1.000 *	0.999 *	4.329)	+	
	1.052 *	0.915 *	8.189)	+	
	1.000 *	1.000 *	5.371)	+ =	17.579

Total of 3 streams to confluence:

Flow rates before confluence point:

4.329 8.189 5.371

Maximum flow rates at confluence using above data:

17.581 17.410 17.579

Area of streams before confluence:

1.270 2.840 1.770

Effective area values after confluence:

5.640 5.880 5.637

Results of confluence:

Total flow rate = 17.581(CFS)

Time of concentration = 9.354 min.

Effective stream area after confluence = 5.640(Ac.)

Study area average Pervious fraction(A_p) = 0.100

Study area average soil loss rate(Fm) = 0.020(In/Hr)

Study area total (this main stream) = 5.88(Ac.)

+++++
+++++

Process from Point/Station 154.000 to Point/Station
103.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 47.500(Ft.)
 Downstream point/station elevation = 46.200(Ft.)
 Pipe length = 265.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 17.581(CFS)
 Nearest computed pipe diameter = 27.00(In.)
 Calculated individual pipe flow = 17.581(CFS)
 Normal flow depth in pipe = 18.44(In.)
 Flow top width inside pipe = 25.12(In.)
 Critical Depth = 17.57(In.)
 Pipe flow velocity = 6.08(Ft/s)
 Travel time through pipe = 0.73 min.
 Time of concentration (TC) = 10.08 min.

+++++
+++++

++++
Process from Point/Station 154.000 to Point/Station
103.000
***** CONFLUENCE OF MAIN STREAMS *****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 5.640(Ac.)
Runoff from this stream = 17.581(CFS)
Time of concentration = 10.08 min.
Rainfall intensity = 3.244(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (AC.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	2.69	8.113	9.79	0.065	3.298
2	5.64	17.581	10.08	0.020	3.244
Qmax(1) =					
	1.000 *	1.000 *	8.113)	+	
	1.017 *	0.971 *	17.581)	+ =	25.472
Qmax(2) =					
	0.983 *	1.000 *	8.113)	+	
	1.000 *	1.000 *	17.581)	+ =	25.557

Total of 2 main streams to confluence:

Flow rates before confluence point:

9.113 18.581

Maximum flow rates at confluence using above data:

25.472 25.557

Area of streams before confluence:

2.695 5.640

Effective area values after confluence:

8.171 8.334

Results of confluence:

Total flow rate = 25.557(CFS)

Time of concentration = 10.081 min.

Effective stream area after confluence = 8.334(Ac.)

Study area average Pervious fraction(Ap) = 0.173

Study area average soil loss rate(Fm) = 0.035(In/Hr)

Study area total = 8.33(Ac.)

+++++
+++++
Process from Point/Station 103.000 to Point/Station

104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 46.200(Ft.)
Downstream point/station elevation = 45.500(Ft.)
Pipe length = 145.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 25.557(CFS)
Nearest computed pipe diameter = 30.00(In.)

Calculated individual pipe flow = 25.557(CFS)
Normal flow depth in pipe = 22.18(In.)
Flow top width inside pipe = 26.34(In.)
Critical Depth = 20.67(In.)
Pipe flow velocity = 6.57(Ft/s)
Travel time through pipe = 0.37 min.
Time of concentration (TC) = 10.45 min.

+++++
+++++ Process from Point/Station 103.000 to Point/Station
104.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 8.334(Ac.)
Runoff from this stream = 25.557(CFS)
Time of concentration = 10.45 min.
Rainfall intensity = 3.178(In/Hr)
Area averaged loss rate (Fm) = 0.0345(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1727
Program is now starting with Main Stream No. 2

+++++
+++++ Process from Point/Station 104.100 to Point/Station
104.200
**** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.170 (In/Hr)
Initial subarea data:
Initial area flow distance = 160.000(Ft.)
Top (of initial area) elevation = 56.000(Ft.)
Bottom (of initial area) elevation = 53.500(Ft.)
Difference in elevation = 2.500(Ft.)
Slope = 0.01563 s(%)= 1.56
TC = k(0.483)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.450 min.
Rainfall intensity = 3.584(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.857
Subarea runoff = 0.891(CFS)
Total initial stream area = 0.290(Ac.)

+++++
+++++ Process from Point/Station 104.100 to Point/Station
104.200
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 0.290(Ac.)
Runoff from this stream = 0.891(CFS)
Time of concentration = 8.45 min.
Rainfall intensity = 3.584(In/Hr)
Area averaged loss rate (Fm) = 0.1700(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8500

++++++
+++++ Process from Point/Station 104.300 to Point/Station
104.200 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 420.000(Ft.)
Top (of initial area) elevation = 57.200(Ft.)
Bottom (of initial area) elevation = 53.500(Ft.)
Difference in elevation = 3.700(Ft.)
Slope = 0.00881 s(%)= 0.88
TC = $k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 8.774 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084(Ft.)
for this Development Type
Rainfall intensity = 3.509(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 2.920(CFS)
Total initial stream area = 0.930(Ac.)

+++++
+++++ Process from Point/Station 104.300 to Point/Station
104.200 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 0.930(Ac.)
Runoff from this stream = 2.920(CFS)
Time of concentration = 8.77 min.
Rainfall intensity = 3.509(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	------------	-----------------	----------	------------	----------------------------

1	0.29	0.891	8.45	0.170	3.584
2	0.93	2.920	8.77	0.020	3.509
Qmax(1) =					
	1.000 *	1.000 *	0.891)	+	
	1.022 *	0.963 *	2.920)	+ =	3.764
Qmax(2) =					
	0.978 *	1.000 *	0.891)	+	
	1.000 *	1.000 *	2.920)	+ =	3.792

Total of 2 streams to confluence:

Flow rates before confluence point:

0.891 2.920

Maximum flow rates at confluence using above data:

3.764 3.792

Area of streams before confluence:

0.290 0.930

Effective area values after confluence:

1.186 1.220

Results of confluence:

Total flow rate = 3.792(CFS)

Time of concentration = 8.774 min.

Effective stream area after confluence = 1.220(Ac.)

Study area average Pervious fraction(A_p) = 0.278

Study area average soil loss rate(F_m) = 0.056(In/Hr)

Study area total (this main stream) = 1.22(Ac.)

+++++

++++
Process from Point/Station 104.200 to Point/Station
104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.500(Ft.)
 Downstream point/station elevation = 45.500(Ft.)
 Pipe length = 25.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 3.792(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 3.792(CFS)
 Normal flow depth in pipe = 4.88(In.)
 Flow top width inside pipe = 8.97(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 15.49(Ft/s)
 Travel time through pipe = 0.03 min.
 Time of concentration (TC) = 8.80 min.

+++++

++++
Process from Point/Station 104.200 to Point/Station
104.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2

Stream flow area = 1.220(Ac.)

Runoff from this stream = 3.792(CFS)

Time of concentration = 8.80 min.

Rainfall intensity = 3.503 (In/Hr)
Area averaged loss rate (Fm) = 0.0557 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.2783
Program is now starting with Main Stream No. 3

+++++
+++ Process from Point/Station 104.400 to Point/Station
104.500 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 160.000 (Ft.)
Top (of initial area) elevation = 56.000 (Ft.)
Bottom (of initial area) elevation = 53.500 (Ft.)
Difference in elevation = 2.500 (Ft.)
Slope = 0.01563 s(%)= 1.56
TC = $k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 5.318 min.
Rainfall intensity = 4.658 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 0.501 (CFS)
Total initial stream area = 0.120 (Ac.)

+++++
+++ Process from Point/Station 104.400 to Point/Station
104.500 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 3 in normal stream number 1
Stream flow area = 0.120 (Ac.)
Runoff from this stream = 0.501 (CFS)
Time of concentration = 5.32 min.
Rainfall intensity = 4.658 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 104.600 to Point/Station
104.500 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 SCS curve number for soil(AMC 2) = 75.00
 Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
 Max Catchment Loss (Fm) = 0.020 (In/Hr)
 Initial subarea data:
 Initial area flow distance = 265.000 (Ft.)
 Top (of initial area) elevation = 55.800 (Ft.)
 Bottom (of initial area) elevation = 53.500 (Ft.)
 Difference in elevation = 2.300 (Ft.)
 Slope = 0.00868 s(%)= 0.87
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
 Initial area time of concentration = 7.319 min.
 Rainfall intensity = 3.888 (In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
 Subarea runoff = 1.497 (CFS)
 Total initial stream area = 0.430 (Ac.)

++++++
 ++++ Process from Point/Station 104.600 to Point/Station
 104.500
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 3 in normal stream number 2
 Stream flow area = 0.430 (Ac.)
 Runoff from this stream = 1.497 (CFS)
 Time of concentration = 7.32 min.
 Rainfall intensity = 3.888 (In/Hr)
 Area averaged loss rate (Fm) = 0.0200 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	0.12	0.501	5.32	0.020	4.658
2	0.43	1.497	7.32	0.020	3.888
Qmax(1) =					
1.000 * 1.000 * 0.501) +					
1.199 * 0.727 * 1.497) + = 1.805					
Qmax(2) =					
0.834 * 1.000 * 0.501) +					
1.000 * 1.000 * 1.497) + = 1.915					

Total of 2 streams to confluence:
 Flow rates before confluence point:
 0.501 1.497
 Maximum flow rates at confluence using above data:
 1.805 1.915
 Area of streams before confluence:
 0.120 0.430
 Effective area values after confluence:
 0.432 0.550
 Results of confluence:
 Total flow rate = 1.915 (CFS)
 Time of concentration = 7.319 min.
 Effective stream area after confluence = 0.550 (Ac.)

Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.020 (In/Hr)
Study area total (this main stream) = 0.55 (Ac.)

+++++
+++++ Process from Point/Station 104.500 to Point/Station
104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.500 (Ft.)
Downstream point/station elevation = 45.500 (Ft.)
Pipe length = 25.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.915 (CFS)
Nearest computed pipe diameter = 6.00 (In.)
Calculated individual pipe flow = 1.915 (CFS)
Normal flow depth in pipe = 4.26 (In.)
Flow top width inside pipe = 5.44 (In.)
Critical depth could not be calculated.
Pipe flow velocity = 12.84 (Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 7.35 min.

+++++
+++++ Process from Point/Station 104.500 to Point/Station
104.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area = 0.550 (Ac.)
Runoff from this stream = 1.915 (CFS)
Time of concentration = 7.35 min.
Rainfall intensity = 3.878 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	8.33	25.557	10.45	0.035	3.178
2	1.22	3.792	8.80	0.056	3.503
3	0.55	1.915	7.35	0.020	3.878

Qmax(1) =
1.000 * 1.000 * 25.557) +
0.906 * 1.000 * 3.792) +
0.819 * 1.000 * 1.915) + = 30.559
Qmax(2) =
1.103 * 0.842 * 25.557) +
1.000 * 1.000 * 3.792) +
0.903 * 1.000 * 1.915) + = 29.266
Qmax(3) =
1.223 * 0.704 * 25.557) +
1.109 * 0.835 * 3.792) +

1.000 * 1.000 * 1.915) + = 27.411

Total of 3 main streams to confluence:

Flow rates before confluence point:

26.557 4.792 2.915

Maximum flow rates at confluence using above data:

30.559 29.266 27.411

Area of streams before confluence:

8.334 1.220 0.550

Effective area values after confluence:

10.104 8.790 7.433

Results of confluence:

Total flow rate = 30.559(CFS)

Time of concentration = 10.449 min.

Effective stream area after confluence = 10.104(Ac.)

Study area average Pervious fraction(A_p) = 0.181

Study area average soil loss rate(F_m) = 0.036(In/Hr)

Study area total = 10.10(Ac.)

++++++
+++ Process from Point/Station 104.000 to Point/Station
105.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 45.500(Ft.)
Downstream point/station elevation = 45.000(Ft.)
Pipe length = 100.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 30.559(CFS)
Nearest computed pipe diameter = 33.00(In.)
Calculated individual pipe flow = 30.559(CFS)
Normal flow depth in pipe = 22.68(In.)
Flow top width inside pipe = 30.60(In.)
Critical Depth = 22.04(In.)
Pipe flow velocity = 7.02(Ft/s)
Travel time through pipe = 0.24 min.
Time of concentration (TC) = 10.69 min.

++++++
+++ Process from Point/Station 105.100 to Point/Station
105.000 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.200(In/Hr)
Max Catchment Loss (F_m) = 0.020(In/Hr)
Time of concentration = 10.69 min.
Rainfall intensity = 3.138(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with

modified
rational method) (Q=KCIA) is C = 0.890
Subarea runoff = 0.764(CFS) for 1.110(Ac.)
Total runoff = 31.324(CFS) Total area = 11.21(Ac.)
Area averaged Fm value = 0.035(In/Hr)

+++++
+++++ Process from Point/Station 105.000 to Point/Station
106.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 45.000(Ft.)
Downstream point/station elevation = 43.700(Ft.)
Pipe length = 105.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 31.324(CFS)
Nearest computed pipe diameter = 27.00(In.)
Calculated individual pipe flow = 31.324(CFS)
Normal flow depth in pipe = 20.19(In.)
Flow top width inside pipe = 23.45(In.)
Critical Depth = 23.18(In.)
Pipe flow velocity = 9.82(Ft/s)
Travel time through pipe = 0.18 min.
Time of concentration (TC) = 10.86 min.

+++++
+++++ Process from Point/Station 105.000 to Point/Station
106.000 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 11.214(Ac.)
Runoff from this stream = 31.324(CFS)
Time of concentration = 10.86 min.
Rainfall intensity = 3.109(In/Hr)
Area averaged loss rate (Fm) = 0.0347(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1734
Program is now starting with Main Stream No. 2

+++++
+++++ Process from Point/Station 106.100 to Point/Station
106.200 **** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp)= 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.170(In/Hr)

Initial subarea data:
 Initial area flow distance = 265.000(Ft.)
 Top (of initial area) elevation = 56.000(Ft.)
 Bottom (of initial area) elevation = 54.300(Ft.)
 Difference in elevation = 1.700(Ft.)
 Slope = 0.00642 s(%)= 0.64
 $TC = k(0.483) * [(length^3) / (elevation change)]^{0.2}$
 Initial area time of concentration = 12.354 min.
 Rainfall intensity = 2.891(In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.847
 Subarea runoff = 0.245(CFS)
 Total initial stream area = 0.100(Ac.)

++++++
 ++++ Process from Point/Station 106.200 to Point/Station
 106.300 **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 54.300(Ft.)
 End of street segment elevation = 50.000(Ft.)
 Length of street segment = 450.000(Ft.)
 Height of curb above gutter flowline = 6.0(In.)
 Width of half street (curb to crown) = 22.000(Ft.)
 Distance from crown to crossfall grade break = 18.000(Ft.)
 Slope from gutter to grade break (v/hz) = 0.020
 Slope from grade break to crown (v/hz) = 0.020
 Street flow is on [1] side(s) of the street
 Distance from curb to property line = 10.000(Ft.)
 Slope from curb to property line (v/hz) = 0.020
 Gutter width = 2.000(Ft.)
 Gutter hike from flowline = 2.000(In.)
 Manning's N in gutter = 0.0150
 Manning's N from gutter to grade break = 0.0150
 Manning's N from grade break to crown = 0.0150
 Estimated mean flow rate at midpoint of street = 0.720(CFS)
 Depth of flow = 0.235(Ft.), Average velocity = 1.711(Ft/s)
 Streetflow hydraulics at midpoint of street travel:
 Halfstreet flow width = 5.425(Ft.)
 Flow velocity = 1.71(Ft/s)
 Travel time = 4.38 min. TC = 16.74 min.
 Adding area flow to street
 COMMERCIAL subarea type
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 SCS curve number for soil (AMC 2) = 75.00
 Previous ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200(In/Hr)
 Max Catchment Loss (Fm) = 0.020(In/Hr)
 Rainfall intensity = 2.434(In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.882
 Subarea runoff = 0.872(CFS) for 0.420(Ac.)
 Total runoff = 1.116(CFS) Total area = 0.52(Ac.)
 Area averaged Fm value = 0.049(In/Hr)
 Street flow at end of street = 1.116(CFS)
 Half street flow at end of street = 1.116(CFS)

Depth of flow = 0.264(Ft.), Average velocity = 1.857(Ft/s)
Flow width (from curb towards crown)= 6.889(Ft.)

++++++
+++
106.400 Process from Point/Station 106.300 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 46.000(Ft.)
Downstream point/station elevation = 45.700(Ft.)
Pipe length = 45.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.116(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 1.116(CFS)
Normal flow depth in pipe = 6.24(In.)
Flow top width inside pipe = 8.30(In.)
Critical Depth = 5.83(In.)
Pipe flow velocity = 3.42(Ft/s)
Travel time through pipe = 0.22 min.
Time of concentration (TC) = 16.96 min.

++++++
+++
106.400 Process from Point/Station 106.300 to Point/Station
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 0.520(Ac.)
Runoff from this stream = 1.116(CFS)
Time of concentration = 16.96 min.
Rainfall intensity = 2.417(In/Hr)
Area averaged loss rate (Fm) = 0.0488(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2442

++++++
+++
106.600 Process from Point/Station 106.500 to Point/Station
***** INITIAL AREA EVALUATION *****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.170(In/Hr)
Initial subarea data:
Initial area flow distance = 185.000(Ft.)
Top (of initial area) elevation = 55.000(Ft.)
Bottom (of initial area) elevation = 52.500(Ft.)
Difference in elevation = 2.500(Ft.)

Slope = 0.01351 s(%)= 1.35
TC = $k(0.483) * [(length^3) / (\text{elevation change})]^{0.2}$
Initial area time of concentration = 9.219 min.
Rainfall intensity = 3.412 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.855
Subarea runoff = 0.817 (CFS)
Total initial stream area = 0.280 (Ac.)

++++++

Process from Point/Station 106.600 to Point/Station
106.700
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ***

Top of street segment elevation = 52.500 (Ft.)
End of street segment elevation = 50.500 (Ft.)
Length of street segment = 270.000 (Ft.)
Height of curb above gutter flowline = 6.0 (In.)
Width of half street (curb to crown) = 22.000 (Ft.)
Distance from crown to crossfall grade break = 18.000 (Ft.)
Slope from gutter to grade break (v/hz) = 0.020
Slope from grade break to crown (v/hz) = 0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line = 30.000 (Ft.)
Slope from curb to property line (v/hz) = 0.020
Gutter width = 2.000 (Ft.)
Gutter hike from flowline = 0.130 (In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 1.758 (CFS)
Depth of flow = 0.172 (Ft.), Average velocity = 1.788 (Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 10.061 (Ft.)
Flow velocity = 1.79 (Ft/s)
Travel time = 2.52 min. TC = 11.74 min.
Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil (AMC 2) = 75.00
Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Rainfall intensity = 2.976 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.881
Subarea runoff = 1.806 (CFS) for 0.720 (Ac.)
Total runoff = 2.623 (CFS) Total area = 1.00 (Ac.)
Area averaged Fm value = 0.062 (In/Hr)
Street flow at end of street = 2.623 (CFS)
Half street flow at end of street = 2.623 (CFS)
Depth of flow = 0.204 (Ft.), Average velocity = 1.980 (Ft/s)
Flow width (from curb towards crown) = 11.636 (Ft.)

++++++

++++
Process from Point/Station 106.700 to Point/Station
106.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 46.500(Ft.)
Downstream point/station elevation = 45.700(Ft.)
Pipe length = 40.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.623(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 2.623(CFS)
Normal flow depth in pipe = 6.14(In.)
Flow top width inside pipe = 12.00(In.)
Critical Depth = 8.33(In.)
Pipe flow velocity = 6.48(Ft/s)
Travel time through pipe = 0.10 min.
Time of concentration (TC) = 11.84 min.

++++++
++++
Process from Point/Station 106.700 to Point/Station
106.400
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 1.000(Ac.)
Runoff from this stream = 2.623(CFS)
Time of concentration = 11.84 min.
Rainfall intensity = 2.962(In/Hr)
Area averaged loss rate (Fm) = 0.0620(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3100

++++++
++++
Process from Point/Station 106.800 to Point/Station
106.900
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.020(In/Hr)
Initial subarea data:
Initial area flow distance = 215.000(Ft.)
Top (of initial area) elevation = 56.000(Ft.)
Bottom (of initial area) elevation = 50.000(Ft.)
Difference in elevation = 6.000(Ft.)
Slope = 0.02791 s(%)= 2.79
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 5.330 min.
Rainfall intensity = 4.652(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896

Subarea runoff = 4.044 (CFS)
Total initial stream area = 0.970 (Ac.)

+++++
+++ Process from Point/Station 106.900 to Point/Station
106.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 46.000 (Ft.)
Downstream point/station elevation = 45.700 (Ft.)
Pipe length = 30.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.044 (CFS)
Nearest computed pipe diameter = 15.00 (In.)
Calculated individual pipe flow = 4.044 (CFS)
Normal flow depth in pipe = 8.60 (In.)
Flow top width inside pipe = 14.84 (In.)
Critical Depth = 9.76 (In.)
Pipe flow velocity = 5.56 (Ft/s)
Travel time through pipe = 0.09 min.
Time of concentration (TC) = 5.42 min.

+++++
+++ Process from Point/Station 106.900 to Point/Station
106.400
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 3
Stream flow area = 0.970 (Ac.)
Runoff from this stream = 4.044 (CFS)
Time of concentration = 5.42 min.
Rainfall intensity = 4.609 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	0.52	1.116	16.96	0.049	2.417
2	1.00	2.623	11.84	0.062	2.962
3	0.97	4.044	5.42	0.020	4.609
Qmax(1) = 1.000 * 1.000 * 1.116) + 0.812 * 1.000 * 2.623) + 0.522 * 1.000 * 4.044) + = 5.358					
Qmax(2) = 1.230 * 0.698 * 1.116) + 1.000 * 1.000 * 2.623) + 0.641 * 1.000 * 4.044) + = 6.174					
Qmax(3) = 1.926 * 0.320 * 1.116) + 1.568 * 0.458 * 2.623) + 1.000 * 1.000 * 4.044) + = 6.614					

Total of 3 streams to confluence:
 Flow rates before confluence point:
 1.116 2.623 4.044
 Maximum flow rates at confluence using above data:
 5.358 6.174 6.614
 Area of streams before confluence:
 0.520 1.000 0.970
 Effective area values after confluence:
 2.490 2.333 1.594
 Results of confluence:
 Total flow rate = 6.614 (CFS)
 Time of concentration = 5.420 min.
 Effective stream area after confluence = 1.594 (Ac.)
 Study area average Pervious fraction(A_p) = 0.214
 Study area average soil loss rate(F_m) = 0.043 (In/Hr)
 Study area total (this main stream) = 2.49 (Ac.)

++++++
 ++++ Process from Point/Station 106.400 to Point/Station
 106.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 45.700 (Ft.)
 Downstream point/station elevation = 43.700 (Ft.)
 Pipe length = 395.00 (Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 6.614 (CFS)
 Nearest computed pipe diameter = 18.00 (In.)
 Calculated individual pipe flow = 6.614 (CFS)
 Normal flow depth in pipe = 13.16 (In.)
 Flow top width inside pipe = 15.96 (In.)
 Critical Depth = 11.94 (In.)
 Pipe flow velocity = 4.78 (Ft/s)
 Travel time through pipe = 1.38 min.
 Time of concentration (TC) = 6.80 min.

++++++
 ++++ Process from Point/Station 106.400 to Point/Station
 106.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
 In Main Stream number: 2
 Stream flow area = 1.594 (Ac.)
 Runoff from this stream = 6.614 (CFS)
 Time of concentration = 6.80 min.
 Rainfall intensity = 4.054 (In/Hr)
 Area averaged loss rate (F_m) = 0.0429 (In/Hr)
 Area averaged Pervious ratio (A_p) = 0.2145
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	F_m (In/Hr)	Rainfall Intensity (In/Hr)
1	11.21	31.324	10.86	0.035	3.109

2	1.59	6.614	6.80	0.043	4.054
Qmax(1) =					
	1.000 *	1.000 *	31.324)	+	
	0.764 *	1.000 *	6.614)	+ =	36.380
Qmax(2) =					
	1.307 *	0.626 *	31.324)	+	
	1.000 *	1.000 *	6.614)	+ =	32.238

Total of 2 main streams to confluence:

Flow rates before confluence point:

32.324	7.614
--------	-------

Maximum flow rates at confluence using above data:

36.380	32.238
--------	--------

Area of streams before confluence:

11.214	1.594
--------	-------

Effective area values after confluence:

12.808	8.611
--------	-------

Results of confluence:

Total flow rate = 36.380(CFS)

Time of concentration = 10.865 min.

Effective stream area after confluence = 12.808(Ac.)

Study area average Pervious fraction(A_p) = 0.179

Study area average soil loss rate(F_m) = 0.036(In/Hr)

Study area total = 12.81(Ac.)

++++++

++++
Process from Point/Station 106.000 to Point/Station
107.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 43.700(Ft.)
 Downstream point/station elevation = 41.800(Ft.)
 Pipe length = 370.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 36.380(CFS)
 Nearest computed pipe diameter = 33.00(In.)
 Calculated individual pipe flow = 36.380(CFS)
 Normal flow depth in pipe = 25.93(In.)
 Flow top width inside pipe = 27.08(In.)
 Critical Depth = 24.11(In.)
 Pipe flow velocity = 7.27(Ft/s)
 Travel time through pipe = 0.85 min.
 Time of concentration (TC) = 11.71 min.

++++++

++++
Process from Point/Station 107.100 to Point/Station
107.000
**** SUBAREA FLOW ADDITION ****

PARK subarea
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.170
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.830

SCS curve number for soil(AMC 2) = 71.77
Pervious ratio(A_p) = 0.8500 Max loss rate(F_p)= 0.217 (In/Hr)
Max Catchment Loss (F_m) = 0.184 (In/Hr)
The area added to the existing stream with this TC
does not add flow per Para 6b, Page D-15 of the OCHM,
therefore the upstream flow rate of Q = 36.380(CFS) is being
used
Time of concentration = 11.71 min.
Rainfall intensity = 2.979 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with
modified
rational method) ($Q=KCIA$) is C = 0.888
Subarea runoff = 0.000(CFS) for 0.290(Ac.)
Total runoff = 36.380(CFS) Total area = 13.10(Ac.)
Area averaged F_m value = 0.039 (In/Hr)

+++++
+++ Process from Point/Station 107.000 to Point/Station
107.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 13.098 (Ac.)
Runoff from this stream = 36.380 (CFS)
Time of concentration = 11.71 min.
Rainfall intensity = 2.979 (In/Hr)
Area averaged loss rate (F_m) = 0.0390 (In/Hr)
Area averaged Pervious ratio (A_p) = 0.1934
Program is now starting with Main Stream No. 2

+++++
+++ Process from Point/Station 108.100 to Point/Station
108.200
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.180
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.820
SCS curve number for soil(AMC 2) = 71.58
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p)= 0.218 (In/Hr)
Max Catchment Loss (F_m) = 0.022 (In/Hr)
Initial subarea data:
Initial area flow distance = 320.000 (Ft.)
Top (of initial area) elevation = 55.500 (Ft.)
Bottom (of initial area) elevation = 51.500 (Ft.)
Difference in elevation = 4.000 (Ft.)
Slope = 0.01250 s(%)= 1.25
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 7.338 min.
Rainfall intensity = 3.882 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area ($Q=KCIA$) is C = 0.895
Subarea runoff = 6.463 (CFS)

Total initial stream area = 1.860 (Ac.)

+++++
+++ Process from Point/Station 108.200 to Point/Station
108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 47.500 (Ft.)
Downstream point/station elevation = 47.200 (Ft.)
Pipe length = 25.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.463 (CFS)
Nearest computed pipe diameter = 15.00 (In.)
Calculated individual pipe flow = 6.463 (CFS)
Normal flow depth in pipe = 11.26 (In.)
Flow top width inside pipe = 12.97 (In.)
Critical Depth = 12.29 (In.)
Pipe flow velocity = 6.54 (Ft/s)
Travel time through pipe = 0.06 min.
Time of concentration (TC) = 7.40 min.

+++++
+++ Process from Point/Station 108.200 to Point/Station
108.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 1.860 (Ac.)
Runoff from this stream = 6.463 (CFS)
Time of concentration = 7.40 min.
Rainfall intensity = 3.863 (In/Hr)
Area averaged loss rate (Fm) = 0.0218 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 108.300 to Point/Station
108.400
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.600
SCS curve number for soil(AMC 2) = 67.40
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.240 (In/Hr)
Max Catchment Loss (Fm) = 0.024 (In/Hr)
Initial subarea data:
Initial area flow distance = 320.000 (Ft.)
Top (of initial area) elevation = 55.500 (Ft.)
Bottom (of initial area) elevation = 51.500 (Ft.)
Difference in elevation = 4.000 (Ft.)
Slope = 0.01250 s(%)= 1.25

TC = $k(0.304) * [(length^3) / (\text{elevation change})]^{0.2}$
 Initial area time of concentration = 7.338 min.
 Rainfall intensity = 3.882 (In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.894
 Subarea runoff = 4.827 (CFS)
 Total initial stream area = 1.390 (Ac.)

++++++
 ++++ Process from Point/Station 108.400 to Point/Station
 108.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 47.500 (Ft.)
 Downstream point/station elevation = 47.200 (Ft.)
 Pipe length = 25.00 (Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 4.827 (CFS)
 Nearest computed pipe diameter = 15.00 (In.)
 Calculated individual pipe flow = 4.827 (CFS)
 Normal flow depth in pipe = 9.09 (In.)
 Flow top width inside pipe = 14.66 (In.)
 Critical Depth = 10.69 (In.)
 Pipe flow velocity = 6.20 (Ft/s)
 Travel time through pipe = 0.07 min.
 Time of concentration (TC) = 7.40 min.

++++++
 ++++ Process from Point/Station 108.400 to Point/Station
 108.000 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
 Stream flow area = 1.390 (Ac.)
 Runoff from this stream = 4.827 (CFS)
 Time of concentration = 7.40 min.
 Rainfall intensity = 3.862 (In/Hr)
 Area averaged loss rate (Fm) = 0.0240 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	------------	-----------------	----------	------------	----------------------------

1	1.86	6.463	7.40	0.022	3.863
2	1.39	4.827	7.40	0.024	3.862
Qmax(1) =					
	1.000 *	1.000 *	6.463)	+	
	1.000 *	1.000 *	4.827)	+ =	11.288
Qmax(2) =					
	1.000 *	1.000 *	6.463)	+	
	1.000 *	1.000 *	4.827)	+ =	11.288

Total of 2 streams to confluence:
 Flow rates before confluence point:
 6.463 4.827

Maximum flow rates at confluence using above data:
 11.288 11.288
 Area of streams before confluence:
 1.860 1.390
 Effective area values after confluence:
 3.249 3.250
 Results of confluence:
 Total flow rate = 11.288 (CFS)
 Time of concentration = 7.401 min.
 Effective stream area after confluence = 3.249 (Ac.)
 Study area average Pervious fraction(Ap) = 0.100
 Study area average soil loss rate(Fm) = 0.023 (In/Hr)
 Study area total (this main stream) = 3.25 (Ac.)

+++++
 ++++++
 ++++ Process from Point/Station 108.000 to Point/Station
 107.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 47.200 (Ft.)
 Downstream point/station elevation = 41.800 (Ft.)
 Pipe length = 330.00 (Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 11.288 (CFS)
 Nearest computed pipe diameter = 18.00 (In.)
 Calculated individual pipe flow = 11.288 (CFS)
 Normal flow depth in pipe = 12.63 (In.)
 Flow top width inside pipe = 16.47 (In.)
 Critical Depth = 15.40 (In.)
 Pipe flow velocity = 8.52 (Ft/s)
 Travel time through pipe = 0.65 min.
 Time of concentration (TC) = 8.05 min.

+++++
 ++++++
 ++++ Process from Point/Station 108.000 to Point/Station
 107.000 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
 In Main Stream number: 2
 Stream flow area = 3.249 (Ac.)
 Runoff from this stream = 11.288 (CFS)
 Time of concentration = 8.05 min.
 Rainfall intensity = 3.685 (In/Hr)
 Area averaged loss rate (Fm) = 0.0227 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	13.10	36.380	11.71	0.039	2.979
2	3.25	11.288	8.05	0.023	3.685
Qmax(1) = 1.000 * 1.000 * 36.380) +					

	0.807 *	1.000 *	11.288) + =	45.494
$Q_{max}(2) =$	1.240 *	0.687 *	36.380) +	
	1.000 *	1.000 *	11.288) + =	42.277

Total of 2 main streams to confluence:

Flow rates before confluence point:

37.380	12.288
--------	--------

Maximum flow rates at confluence using above data:

45.494	42.277
--------	--------

Area of streams before confluence:

13.098	3.249
--------	-------

Effective area values after confluence:

16.348	12.248
--------	--------

Results of confluence:

Total flow rate = 45.494 (CFS)

Time of concentration = 11.713 min.

Effective stream area after confluence = 16.348 (Ac.)

Study area average Pervious fraction(Ap) = 0.175

Study area average soil loss rate(Fm) = 0.036 (In/Hr)

Study area total = 16.35 (Ac.)

+++++
+++++ Process from Point/Station 108.600 to Point/Station
107.000
**** SUBAREA FLOW ADDITION ****

PARK subarea
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 1.000
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.000
 SCS curve number for soil(AMC 2) = 56.00
 Pervious ratio(Ap) = 0.8500 Max loss rate(Fp) = 0.300 (In/Hr)
 Max Catchment Loss (Fm) = 0.255 (In/Hr)
 The area added to the existing stream with this TC
 does not add flow per Para 6b, Page D-15 of the OCHM,
 therefore the upstream flow rate of Q = 45.494 (CFS) is being
 used
 Time of concentration = 11.71 min.
 Rainfall intensity = 2.979 (In/Hr) for a 25.0 year storm
 Effective runoff coefficient used for area, (total area with
 modified
 rational method) ($Q=KCIA$) is $C = 0.888$
 Subarea runoff = 0.000 (CFS) for 0.180 (Ac.)
 Total runoff = 45.494 (CFS) Total area = 16.53 (Ac.)
 Area averaged Fm value = 0.038 (In/Hr)
 End of computations, total study area = 17.74 (Ac.)
 The following figures may
 be used for a unit hydrograph study of the same area.
 Note: These figures do not consider reduced effective area
 effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.183

Area averaged SCS curve number (AMC 2) = 73.8

Orange County Rational Hydrology Program
(Hydrology Manual Date(s) October 1986 & November
1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2004
Version 8.0
Rational Hydrology Study, Date: 11/14/11 File Name:
100288PRB25.roc

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
DEVELOPED CONDITION
AREA B

Program License Serial Number 4014

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 25.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

+++++
+++++ Process from Point/Station 200.000 to Point/Station
201.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 385.000 (Ft.)
Top (of initial area) elevation = 55.500 (Ft.)
Bottom (of initial area) elevation = 52.500 (Ft.)
Difference in elevation = 3.000 (Ft.)
Slope = 0.00779 s(%)= 0.78
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.684 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 3.529 (In/Hr) for a 25.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 3.790(CFS)
Total initial stream area = 1.200(Ac.)

+++++
+++ Process from Point/Station 201.000 to Point/Station
202.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 48.500(Ft.)
Downstream point/station elevation = 48.300(Ft.)
Pipe length = 25.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.790(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 3.790(CFS)
Normal flow depth in pipe = 8.86(In.)
Flow top width inside pipe = 14.75(In.)
Critical Depth = 9.43(In.)
Pipe flow velocity = 5.02(Ft/s)
Travel time through pipe = 0.08 min.
Time of concentration (TC) = 8.77 min.

+++++
+++ Process from Point/Station 201.000 to Point/Station
202.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 1.200(Ac.)
Runoff from this stream = 3.790(CFS)
Time of concentration = 8.77 min.
Rainfall intensity = 3.510(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 202.100 to Point/Station
202.200
**** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp)= 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.170(In/Hr)
Initial subarea data:
Initial area flow distance = 285.000(Ft.)
Top (of initial area) elevation = 54.000(Ft.)
Bottom (of initial area) elevation = 52.500(Ft.)

Difference in elevation = 1.500 (Ft.)
Slope = 0.00526 s(%)= 0.53
TC = $k(0.483) * [(length^3) / (\text{elevation change})]^{0.2}$
Initial area time of concentration = 13.232 min.
Rainfall intensity = 2.781 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.845
Subarea runoff = 2.303 (CFS)
Total initial stream area = 0.980 (Ac.)

+++++
+++ Process from Point/Station 202.300 to Point/Station
202.200 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.550
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.450
SCS curve number for soil (AMC 2) = 64.55
Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.255 (In/Hr)
Max Catchment Loss (Fm) = 0.026 (In/Hr)
Time of concentration = 13.23 min.
Rainfall intensity = 2.781 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.860
Subarea runoff = 1.116 (CFS) for 0.450 (Ac.)
Total runoff = 3.418 (CFS) Total area = 1.43 (Ac.)
Area averaged Fm value = 0.125 (In/Hr)

+++++
+++ Process from Point/Station 202.200 to Point/Station
202.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 48.500 (Ft.)
Downstream point/station elevation = 48.300 (Ft.)
Pipe length = 25.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.418 (CFS)
Nearest computed pipe diameter = 15.00 (In.)
Calculated individual pipe flow = 3.418 (CFS)
Normal flow depth in pipe = 8.30 (In.)
Flow top width inside pipe = 14.91 (In.)
Critical Depth = 8.94 (In.)
Pipe flow velocity = 4.90 (Ft/s)
Travel time through pipe = 0.08 min.
Time of concentration (TC) = 13.32 min.

+++++
+++ Process from Point/Station 202.200 to Point/Station
202.000 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
 Stream flow area = 1.430(Ac.)
 Runoff from this stream = 3.418(CFS)
 Time of concentration = 13.32 min.
 Rainfall intensity = 2.771(In/Hr)
 Area averaged loss rate (Fm) = 0.1245(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.6140
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	1.20	3.790	8.77	0.020	3.510
2	1.43	3.418	13.32	0.125	2.771
Qmax(1) =					
	1.000 *	1.000 *	3.790)	+	
	1.280 *	0.658 *	3.418)	+ =	6.670
Qmax(2) =					
	0.788 *	1.000 *	3.790)	+	
	1.000 *	1.000 *	3.418)	+ =	6.405

Total of 2 streams to confluence:

Flow rates before confluence point:

3.790 3.418

Maximum flow rates at confluence using above data:

6.670 6.405

Area of streams before confluence:

1.200 1.430

Effective area values after confluence:

2.141 2.630

Results of confluence:

Total flow rate = 6.670(CFS)

Time of concentration = 8.767 min.

Effective stream area after confluence = 2.141(Ac.)

Study area average Pervious fraction(Ap) = 0.379

Study area average soil loss rate(Fm) = 0.077(In/Hr)

Study area total (this main stream) = 2.63(Ac.)

+++++
+++++

Process from Point/Station 202.000 to Point/Station
 203.000
 ***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 48.300(Ft.)
 Downstream point/station elevation = 47.100(Ft.)
 Pipe length = 225.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 6.670(CFS)
 Nearest computed pipe diameter = 18.00(In.)
 Calculated individual pipe flow = 6.670(CFS)
 Normal flow depth in pipe = 12.98(In.)
 Flow top width inside pipe = 16.15(In.)
 Critical Depth = 12.00(In.)
 Pipe flow velocity = 4.89(Ft/s)
 Travel time through pipe = 0.77 min.
 Time of concentration (TC) = 9.53 min.

+++++
+++ Process from Point/Station 203.100 to Point/Station
203.000 **** SUBAREA FLOW ADDITION ****

PARK Subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.790
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.210
SCS curve number for soil(AMC 2) = 59.99
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp)= 0.279 (In/Hr)
Max Catchment Loss (Fm) = 0.237 (In/Hr)
Time of concentration = 9.53 min.
Rainfall intensity = 3.348 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.875
Subarea runoff = 0.306 (CFS) for 0.240 (Ac.)
Total runoff = 6.975 (CFS) Total area = 2.38 (Ac.)
Area averaged Fm value = 0.093 (In/Hr)

+++++
+++ Process from Point/Station 203.000 to Point/Station
204.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 47.100 (Ft.)
Downstream point/station elevation = 40.500 (Ft.)
Pipe length = 60.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.975 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 6.975 (CFS)
Normal flow depth in pipe = 6.63 (In.)
Flow top width inside pipe = 11.93 (In.)
Critical depth could not be calculated.
Pipe flow velocity = 15.67 (Ft/s)
Travel time through pipe = 0.06 min.
Time of concentration (TC) = 9.60 min.

+++++
+++ Process from Point/Station 203.000 to Point/Station
204.000 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 2.381 (Ac.)
Runoff from this stream = 6.975 (CFS)
Time of concentration = 9.60 min.
Rainfall intensity = 3.335 (In/Hr)

Area averaged loss rate (Fm) = 0.0930 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.4269
Program is now starting with Main Stream No. 2

+++++
+++++ Process from Point/Station 205.100 to Point/Station
205.200 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 370.000 (Ft.)
Top (of initial area) elevation = 57.900 (Ft.)
Bottom (of initial area) elevation = 56.000 (Ft.)
Difference in elevation = 1.900 (Ft.)
Slope = 0.00514 s(%)= 0.51
TC = $k(0.304)*[(length^3)/(elevation change)]^{0.2}$
Initial area time of concentration = 9.291 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 3.397 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.895
Subarea runoff = 4.711 (CFS)
Total initial stream area = 1.550 (Ac.)

+++++
+++++ Process from Point/Station 205.200 to Point/Station
205.300 **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 56.000 (Ft.)
End of street segment elevation = 48.500 (Ft.)
Length of street segment = 305.000 (Ft.)
Height of curb above gutter flowline = 6.0 (In.)
Width of half street (curb to crown) = 22.000 (Ft.)
Distance from crown to crossfall grade break = 18.000 (Ft.)
Slope from gutter to grade break (v/hz) = 0.020
Slope from grade break to crown (v/hz) = 0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line = 30.000 (Ft.)
Slope from curb to property line (v/hz) = 0.020
Gutter width = 2.000 (Ft.)
Gutter hike from flowline = 0.130 (In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 5.694 (CFS)
Depth of flow = 0.219 (Ft.), Average velocity = 3.771 (Ft/s)

Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 12.407(Ft.)
Flow velocity = 3.77(Ft/s)
Travel time = 1.35 min. TC = 10.64 min.
Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.260
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.740
SCS curve number for soil(AMC 2) = 70.06
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.226 (In/Hr)
Max Catchment Loss (F_m) = 0.023 (In/Hr)
Rainfall intensity = 3.146 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) ($Q=KCIA$) is $C = 0.894$
Subarea runoff = 1.899(CFS) for 0.800(Ac.)
Total runoff = 6.610(CFS) Total area = 2.35(Ac.)
Area averaged F_m value = 0.021(In/Hr)
Street flow at end of street = 6.610(CFS)
Half street flow at end of street = 6.610(CFS)
Depth of flow = 0.233(Ft.), Average velocity = 3.916(Ft/s)
Flow width (from curb towards crown)= 13.104(Ft.)

+++++
+++++ Process from Point/Station 205.200 to Point/Station
205.300
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 2.350(Ac.)
Runoff from this stream = 6.610(CFS)
Time of concentration = 10.64 min.
Rainfall intensity = 3.146 (In/Hr)
Area averaged loss rate (F_m) = 0.0209 (In/Hr)
Area averaged Pervious ratio (A_p) = 0.1000

+++++
+++++ Process from Point/Station 205.310 to Point/Station
205.320
***** INITIAL AREA EVALUATION *****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.8500 Max loss rate(F_p) = 0.200 (In/Hr)
Max Catchment Loss (F_m) = 0.170 (In/Hr)
Initial subarea data:
Initial area flow distance = 350.000(Ft.)
Top (of initial area) elevation = 56.000(Ft.)
Bottom (of initial area) elevation = 52.000(Ft.)

Difference in elevation = 4.000(Ft.)
Slope = 0.01143 s(%)= 1.14
TC = $k(0.483) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 12.302 min.
Rainfall intensity = 2.898(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.847
Subarea runoff = 0.565(CFS)
Total initial stream area = 0.230(Ac.)

+++++
+++++ Process from Point/Station 205.320 to Point/Station
205.300
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 52.000(Ft.)
Downstream point elevation = 48.500(Ft.)
Channel length thru subarea = 560.000(Ft.)
Channel base width = 0.000(Ft.)
Slope or 'Z' of left channel bank = 1.000
Slope or 'Z' of right channel bank = 1.000
Estimated mean flow rate at midpoint of channel = 0.750(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 0.750(CFS)
Depth of flow = 0.538(Ft.), Average velocity = 2.590(Ft/s)
Channel flow top width = 1.076(Ft.)
Flow Velocity = 2.59(Ft/s)
Travel time = 3.60 min.
Time of concentration = 15.91 min.
Critical depth = 0.512(Ft.)
Adding area flow to channel
PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp)= 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.170(In/Hr)
Rainfall intensity = 2.506(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.839
Subarea runoff = 0.297(CFS) for 0.180(Ac.)
Total runoff = 0.862(CFS) Total area = 0.41(Ac.)
Area averaged Fm value = 0.170(In/Hr)
Depth of flow = 0.567(Ft.), Average velocity = 2.682(Ft/s)
Critical depth = 0.539(Ft.)

+++++
+++++ Process from Point/Station 205.320 to Point/Station
205.300
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2

Stream flow area = 0.410 (Ac.)
 Runoff from this stream = 0.862 (CFS)
 Time of concentration = 15.91 min.
 Rainfall intensity = 2.506 (In/Hr)
 Area averaged loss rate (Fm) = 0.1700 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.8500
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	2.35	6.610	10.64	0.021	3.146
2	0.41	0.862	15.91	0.170	2.506
Qmax(1) =					
	1.000 *	1.000 *	6.610)	+	
	1.274 *	0.669 *	0.862)	+ =	7.345
Qmax(2) =					
	0.795 *	1.000 *	6.610)	+	
	1.000 *	1.000 *	0.862)	+ =	6.117

Total of 2 streams to confluence:

Flow rates before confluence point:

6.610 0.862

Maximum flow rates at confluence using above data:

7.345 6.117

Area of streams before confluence:

2.350 0.410

Effective area values after confluence:

2.624 2.760

Results of confluence:

Total flow rate = 7.345 (CFS)

Time of concentration = 10.639 min.

Effective stream area after confluence = 2.624 (Ac.)

Study area average Pervious fraction (Ap) = 0.211

Study area average soil loss rate (Fm) = 0.043 (In/Hr)

Study area total (this main stream) = 2.76 (Ac.)

++++++

++++
Process from Point/Station 205.300 to Point/Station
205.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.500 (Ft.)
 Downstream point/station elevation = 44.300 (Ft.)
 Pipe length = 25.00 (Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 7.345 (CFS)
 Nearest computed pipe diameter = 18.00 (In.)
 Calculated individual pipe flow = 7.345 (CFS)
 Normal flow depth in pipe = 11.98 (In.)
 Flow top width inside pipe = 16.99 (In.)
 Critical Depth = 12.59 (In.)
 Pipe flow velocity = 5.88 (Ft/s)
 Travel time through pipe = 0.07 min.
 Time of concentration (TC) = 10.71 min.

++++++

++++
Process from Point/Station 205.300 to Point/Station
205.400
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 2.624(Ac.)
Runoff from this stream = 7.345(CFS)
Time of concentration = 10.71 min.
Rainfall intensity = 3.134(In/Hr)
Area averaged loss rate (Fm) = 0.0430(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2114

++++++
+++++
Process from Point/Station 205.410 to Point/Station
205.420
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.890
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.110
SCS curve number for soil(AMC 2) = 58.09
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.289(In/Hr)
Max Catchment Loss (Fm) = 0.029(In/Hr)
Initial subarea data:
Initial area flow distance = 450.000(Ft.)
Top (of initial area) elevation = 54.300(Ft.)
Bottom (of initial area) elevation = 48.500(Ft.)
Difference in elevation = 5.800(Ft.)
Slope = 0.01289 s(%)= 1.29
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 8.358 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084(Ft.)
for this Development Type
Rainfall intensity = 3.606(In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.893
Subarea runoff = 1.707(CFS)
Total initial stream area = 0.530(Ac.)

++++++
+++++
Process from Point/Station 205.420 to Point/Station
205.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.500(Ft.)
Downstream point/station elevation = 44.300(Ft.)
Pipe length = 25.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.707(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 1.707(CFS)
Normal flow depth in pipe = 6.25(In.)
Flow top width inside pipe = 11.99(In.)

Critical Depth = 6.67 (In.)
 Pipe flow velocity = 4.13 (Ft/s)
 Travel time through pipe = 0.10 min.
 Time of concentration (TC) = 8.46 min.

++++++
 ++++ Process from Point/Station 205.420 to Point/Station
 205.400 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
 Stream flow area = 0.530 (Ac.)
 Runoff from this stream = 1.707 (CFS)
 Time of concentration = 8.46 min.
 Rainfall intensity = 3.582 (In/Hr)
 Area averaged loss rate (Fm) = 0.0289 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	2.62	7.345	10.71	0.043	3.134
2	0.53	1.707	8.46	0.029	3.582
Qmax(1) =					
	1.000 *	1.000 *	7.345)	+	
	0.874 *	1.000 *	1.707)	+ =	8.836
Qmax(2) =					
	1.145 *	0.790 *	7.345)	+	
	1.000 *	1.000 *	1.707)	+ =	8.348

Total of 2 streams to confluence:
 Flow rates before confluence point:
 7.345 1.707
 Maximum flow rates at confluence using above data:
 8.836 8.348
 Area of streams before confluence:
 2.624 0.530
 Effective area values after confluence:
 3.154 2.603
 Results of confluence:
 Total flow rate = 8.836 (CFS)
 Time of concentration = 10.710 min.
 Effective stream area after confluence = 3.154 (Ac.)
 Study area average Pervious fraction (Ap) = 0.193
 Study area average soil loss rate (Fm) = 0.041 (In/Hr)
 Study area total (this main stream) = 3.15 (Ac.)

++++++
 ++++ Process from Point/Station 205.400 to Point/Station
 205.500 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.300 (Ft.)

Downstream point/station elevation = 44.100(Ft.)
Pipe length = 20.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.836(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 8.836(CFS)
Normal flow depth in pipe = 12.65(In.)
Flow top width inside pipe = 16.46(In.)
Critical Depth = 13.80(In.)
Pipe flow velocity = 6.66(Ft/s)
Travel time through pipe = 0.05 min.
Time of concentration (TC) = 10.76 min.

+++++
+++++ Process from Point/Station 205.510 to Point/Station
205.500
**** SUBAREA FLOW ADDITION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(A_p) = 0.8500 Max loss rate(F_p) = 0.300 (In/Hr)
Max Catchment Loss (F_m) = 0.255 (In/Hr)
Time of concentration = 10.76 min.
Rainfall intensity = 3.126 (In/Hr) for a 25.0 year storm
Effective runoff coefficient used for area, (total area with
modified
rational method) ($Q=KCIA$) is $C = 0.886$
Subarea runoff = 0.233(CFS) for 0.120(Ac.)
Total runoff = 9.069(CFS) Total area = 3.27(Ac.)
Area averaged F_m value = 0.049 (In/Hr)

+++++
+++++ Process from Point/Station 205.500 to Point/Station
205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.100(Ft.)
Downstream point/station elevation = 42.700(Ft.)
Pipe length = 75.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 9.069(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 9.069(CFS)
Normal flow depth in pipe = 10.38(In.)
Flow top width inside pipe = 17.79(In.)
Critical Depth = 13.98(In.)
Pipe flow velocity = 8.59(Ft/s)
Travel time through pipe = 0.15 min.
Time of concentration (TC) = 10.91 min.

+++++
+++++

Process from Point/Station 205.000 to Point/Station
204.500
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 42.700(Ft.)
Downstream point/station elevation = 41.500(Ft.)
Pipe length = 245.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 9.069(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 9.069(CFS)
Normal flow depth in pipe = 14.44(In.)
Flow top width inside pipe = 19.46(In.)
Critical Depth = 13.44(In.)
Pipe flow velocity = 5.14(Ft/s)
Travel time through pipe = 0.79 min.
Time of concentration (TC) = 11.70 min.

+++++
+++
Process from Point/Station 204.500 to Point/Station
204.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 41.500(Ft.)
Downstream point/station elevation = 40.500(Ft.)
Pipe length = 200.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 9.069(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 9.069(CFS)
Normal flow depth in pipe = 14.33(In.)
Flow top width inside pipe = 19.55(In.)
Critical Depth = 13.44(In.)
Pipe flow velocity = 5.19(Ft/s)
Travel time through pipe = 0.64 min.
Time of concentration (TC) = 12.34 min.

+++++
+++
Process from Point/Station 204.500 to Point/Station
204.000
***** CONFLUENCE OF MAIN STREAMS *****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 3.274(Ac.)
Runoff from this stream = 9.069(CFS)
Time of concentration = 12.34 min.
Rainfall intensity = 2.893(In/Hr)
Area averaged loss rate (Fm) = 0.0485(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2168
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	------------	-----------------	----------	------------	----------------------------

1	2.38	6.975	9.60	0.093	3.335
2	3.27	9.069	12.34	0.049	2.893
Qmax(1) =					
	1.000 *	1.000 *	6.975) +		
	1.156 *	0.778 *	9.069) + =		15.125
Qmax(2) =					
	0.864 *	1.000 *	6.975) +		
	1.000 *	1.000 *	9.069) + =		15.093

Total of 2 main streams to confluence:

Flow rates before confluence point:

7.975	10.069
-------	--------

Maximum flow rates at confluence using above data:

15.125	15.093
--------	--------

Area of streams before confluence:

2.381	3.274
-------	-------

Effective area values after confluence:

4.928	5.656
-------	-------

Results of confluence:

Total flow rate = 15.125 (CFS)

Time of concentration = 9.598 min.

Effective stream area after confluence = 4.928 (Ac.)

Study area average Pervious fraction(Ap) = 0.305

Study area average soil loss rate(Fm) = 0.067 (In/Hr)

Study area total = 5.66 (Ac.)

End of computations, total study area = 6.28 (Ac.)

The following figures may

be used for a unit hydrograph study of the same area.

Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.309

Area averaged SCS curve number (AMC 2) = 71.3

Orange County Rational Hydrology Program
(Hydrology Manual Date(s) October 1986 & November
1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2004
Version 8.0
Rational Hydrology Study, Date: 11/14/11 File Name:
100288PRA100.roc

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
DEVELOPED CONDITION
AREA A

Program License Serial Number 4014

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0

Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

+++++
+++++ Process from Point/Station 100.000 to Point/Station
101.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 290.000 (Ft.)
Top (of initial area) elevation = 56.500 (Ft.)
Bottom (of initial area) elevation = 55.000 (Ft.)
Difference in elevation = 1.500 (Ft.)
Slope = 0.00517 s(%)= 0.52
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.416 min.
Rainfall intensity = 4.591 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 2.304 (CFS)

Total initial stream area = 0.560 (Ac.)

+++++
+++ Process from Point/Station 101.000 to Point/Station
102.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 51.000 (Ft.)
Downstream point/station elevation = 50.400 (Ft.)
Pipe length = 115.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.304 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 2.304 (CFS)
Normal flow depth in pipe = 8.86 (In.)
Flow top width inside pipe = 10.55 (In.)
Critical Depth = 7.79 (In.)
Pipe flow velocity = 3.71 (Ft/s)
Travel time through pipe = 0.52 min.
Time of concentration (TC) = 8.93 min.

+++++
+++ Process from Point/Station 101.000 to Point/Station
102.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 0.560 (Ac.)
Runoff from this stream = 2.304 (CFS)
Time of concentration = 8.93 min.
Rainfall intensity = 4.437 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 102.100 to Point/Station
102.200
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil (AMC 2) = 75.00
Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 430.000 (Ft.)
Top (of initial area) elevation = 57.200 (Ft.)
Bottom (of initial area) elevation = 55.000 (Ft.)
Difference in elevation = 2.200 (Ft.)
Slope = 0.00512 s(%) = 0.51

TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.873 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084(Ft.)
for this Development Type
Rainfall intensity = 4.190(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 5.179(CFS)
Total initial stream area = 1.380(Ac.)

++++++
+++
Process from Point/Station 102.200 to Point/Station
102.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 51.000(Ft.)
Downstream point/station elevation = 50.400(Ft.)
Pipe length = 25.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.179(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 5.179(CFS)
Normal flow depth in pipe = 9.23(In.)
Flow top width inside pipe = 10.11(In.)
Critical Depth = 11.11(In.)
Pipe flow velocity = 7.99(Ft/s)
Travel time through pipe = 0.05 min.
Time of concentration (TC) = 9.93 min.

++++++
+++
Process from Point/Station 102.200 to Point/Station
102.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 2
Stream flow area = 1.380(Ac.)
Runoff from this stream = 5.179(CFS)
Time of concentration = 9.93 min.
Rainfall intensity = 4.177(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

++++++
+++
Process from Point/Station 102.300 to Point/Station
102.400
**** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp) = 0.200(In/Hr)

Max Catchment Loss (Fm) = 0.170 (In/Hr)
 Initial subarea data:
 Initial area flow distance = 175.000 (Ft.)
 Top (of initial area) elevation = 57.000 (Ft.)
 Bottom (of initial area) elevation = 55.000 (Ft.)
 Difference in elevation = 2.000 (Ft.)
 Slope = 0.01143 s(%) = 1.14
 $TC = k(0.483) * [(length^3) / (elevation change)]^{0.2}$
 Initial area time of concentration = 9.323 min.
 Rainfall intensity = 4.330 (In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.865
 Subarea runoff = 3.107 (CFS)
 Total initial stream area = 0.830 (Ac.)

++++++
 ++++ Process from Point/Station 102.400 to Point/Station
 102.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 51.000 (Ft.)
 Downstream point/station elevation = 50.400 (Ft.)
 Pipe length = 25.00 (Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 3.107 (CFS)
 Nearest computed pipe diameter = 12.00 (In.)
 Calculated individual pipe flow = 3.107 (CFS)
 Normal flow depth in pipe = 6.44 (In.)
 Flow top width inside pipe = 11.97 (In.)
 Critical Depth = 9.07 (In.)
 Pipe flow velocity = 7.24 (Ft/s)
 Travel time through pipe = 0.06 min.
 Time of concentration (TC) = 9.38 min.

++++++
 ++++ Process from Point/Station 102.400 to Point/Station
 102.000 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 3
 Stream flow area = 0.830 (Ac.)
 Runoff from this stream = 3.107 (CFS)
 Time of concentration = 9.38 min.
 Rainfall intensity = 4.314 (In/Hr)
 Area averaged loss rate (Fm) = 0.1700 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.8500
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	0.56	2.304	8.93	0.020	4.437
2	1.38	5.179	9.93	0.020	4.177
3	0.83	3.107	9.38	0.170	4.314
Qmax(1) = 1.000 * 1.000 * 2.304) +					

1.063 *	0.900 *	5.179) +	
1.030 *	0.952 *	3.107) + =	10.303
Qmax(2) =			
0.941 *	1.000 *	2.304) +	
1.000 *	1.000 *	5.179) +	
0.967 *	1.000 *	3.107) + =	10.351
Qmax(3) =			
0.972 *	1.000 *	2.304) +	
1.033 *	0.945 *	5.179) +	
1.000 *	1.000 *	3.107) + =	10.403

Total of 3 streams to confluence:

Flow rates before confluence point:

2.304	5.179	3.107
-------	-------	-------

Maximum flow rates at confluence using above data:

10.303	10.351	10.403
--------	--------	--------

Area of streams before confluence:

0.560	1.380	0.830
-------	-------	-------

Effective area values after confluence:

2.592	2.770	2.694
-------	-------	-------

Results of confluence:

Total flow rate = 10.403(CFS)

Time of concentration = 9.381 min.

Effective stream area after confluence = 2.694 (Ac.)

Study area average Pervious fraction(A_p) = 0.325

Study area average soil loss rate(F_m) = 0.065 (In/Hr)

Study area total (this main stream) = 2.77 (Ac.)

+++++

Process from Point/Station 102.000 to Point/Station
103.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 50.400(Ft.)
Downstream point/station elevation = 46.200(Ft.)
Pipe length = 205.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 10.403(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 10.403(CFS)
Normal flow depth in pipe = 11.01(In.)
Flow top width inside pipe = 17.54(In.)
Critical Depth = 14.89(In.)
Pipe flow velocity = 9.18(Ft/s)
Travel time through pipe = 0.37 min.
Time of concentration (TC) = 9.75 min.

+++++

Process from Point/Station 102.000 to Point/Station
103.000

**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 1

Stream flow area = 2.694(Ac.)

Runoff from this stream = 10.403(CFS)

Time of concentration = 9.75 min.
Rainfall intensity = 4.219 (In/Hr)
Area averaged loss rate (Fm) = 0.0649 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.3247
Program is now starting with Main Stream No. 2

++++++

Process from Point/Station 150.000 to Point/Station
151.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 100.000 (Ft.)
Top (of initial area) elevation = 57.000 (Ft.)
Bottom (of initial area) elevation = 54.500 (Ft.)
Difference in elevation = 2.500 (Ft.)
Slope = 0.02500 s(%)= 2.50
TC = $k(0.304)*[(length^3)/(elevation change)]^{0.2}$
Initial area time of concentration = 4.011 min.
Rainfall intensity = 7.020 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.897
Subarea runoff = 0.567 (CFS)
Total initial stream area = 0.090 (Ac.)

++++++

Process from Point/Station 151.000 to Point/Station
152.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 50.500 (Ft.)
Downstream point/station elevation = 50.200 (Ft.)
Pipe length = 40.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 0.567 (CFS)
Nearest computed pipe diameter = 9.00 (In.)
Calculated individual pipe flow = 0.567 (CFS)
Normal flow depth in pipe = 3.93 (In.)
Flow top width inside pipe = 8.93 (In.)
Critical Depth = 4.09 (In.)
Pipe flow velocity = 3.05 (Ft/s)
Travel time through pipe = 0.22 min.
Time of concentration (TC) = 4.23 min.

++++++

Process from Point/Station 151.000 to Point/Station
152.000

***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 0.090(Ac.)
Runoff from this stream = 0.567(CFS)
Time of concentration = 4.23 min.
Rainfall intensity = 6.810(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 152.200 to Point/Station
152.100
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.020(In/Hr)
Initial subarea data:
Initial area flow distance = 100.000(Ft.)
Top (of initial area) elevation = 57.000(Ft.)
Bottom (of initial area) elevation = 54.500(Ft.)
Difference in elevation = 2.500(Ft.)
Slope = 0.02500 s(%)= 2.50
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 4.011 min.
Rainfall intensity = 7.020(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.897
Subarea runoff = 0.945(CFS)
Total initial stream area = 0.150(Ac.)

+++++
+++ Process from Point/Station 152.100 to Point/Station
152.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 50.500(Ft.)
Downstream point/station elevation = 50.200(Ft.)
Pipe length = 45.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 0.945(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 0.945(CFS)
Normal flow depth in pipe = 5.55(In.)
Flow top width inside pipe = 8.75(In.)
Critical Depth = 5.34(In.)
Pipe flow velocity = 3.31(Ft/s)
Travel time through pipe = 0.23 min.
Time of concentration (TC) = 4.24 min.

+++++
+++ Process from Point/Station 152.100 to Point/Station
152.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 0.150(Ac.)
Runoff from this stream = 0.945(CFS)
Time of concentration = 4.24 min.
Rainfall intensity = 6.802(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	0.09	0.567	4.23	0.020	6.810
2	0.15	0.945	4.24	0.020	6.802
Qmax(1) =					
1.000 * 1.000 * 0.567) +					
1.001 * 0.998 * 0.945) + = 1.511					
Qmax(2) =					
0.999 * 1.000 * 0.567) +					
1.000 * 1.000 * 0.945) + = 1.511					

Total of 2 streams to confluence:
Flow rates before confluence point:
 0.567 0.945
Maximum flow rates at confluence using above data:
 1.511 1.511
Area of streams before confluence:
 0.090 0.150
Effective area values after confluence:
 0.240 0.240
Results of confluence:
Total flow rate = 1.511(CFS)
Time of concentration = 4.238 min.
Effective stream area after confluence = 0.240(Ac.)
Study area average Pervious fraction(Ap) = 0.100
Study area average soil loss rate(Fm) = 0.020(In/Hr)
Study area total (this main stream) = 0.24(Ac.)

+++++
+++ Process from Point/Station 152.000 to Point/Station
153.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 50.200(Ft.)
Downstream point/station elevation = 49.300(Ft.)
Pipe length = 110.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.511(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 1.511(CFS)

Normal flow depth in pipe = 5.78 (In.)
Flow top width inside pipe = 11.99 (In.)
Critical Depth = 6.25 (In.)
Pipe flow velocity = 4.04 (Ft/s)
Travel time through pipe = 0.45 min.
Time of concentration (TC) = 4.69 min.

+++++
+++++
153.000 Process from Point/Station 152.000 to Point/Station
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 0.240 (Ac.)
Runoff from this stream = 1.511 (CFS)
Time of concentration = 4.69 min.
Rainfall intensity = 6.417 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++++
153.200 Process from Point/Station 153.100 to Point/Station
***** INITIAL AREA EVALUATION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil (AMC 2) = 75.00
Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 310.000 (Ft.)
Top (of initial area) elevation = 56.100 (Ft.)
Bottom (of initial area) elevation = 53.500 (Ft.)
Difference in elevation = 2.600 (Ft.)
Slope = 0.00839 s(%) = 0.84
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.847 min.
Rainfall intensity = 4.779 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 3.855 (CFS)
Total initial stream area = 0.900 (Ac.)

+++++
+++++
153.000 Process from Point/Station 153.200 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 49.500 (Ft.)

Downstream point/station elevation = 49.300(Ft.)
Pipe length = 25.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.855(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 3.855(CFS)
Normal flow depth in pipe = 8.96(In.)
Flow top width inside pipe = 14.71(In.)
Critical Depth = 9.53(In.)
Pipe flow velocity = 5.04(Ft/s)
Travel time through pipe = 0.08 min.
Time of concentration (TC) = 7.93 min.

+++++
+++++ Process from Point/Station 153.200 to Point/Station
153.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 0.900(Ac.)
Runoff from this stream = 3.855(CFS)
Time of concentration = 7.93 min.
Rainfall intensity = 4.751(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++++ Process from Point/Station 153.400 to Point/Station
153.500
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.020(In/Hr)
Initial subarea data:
Initial area flow distance = 90.000(Ft.)
Top (of initial area) elevation = 55.500(Ft.)
Bottom (of initial area) elevation = 53.500(Ft.)
Difference in elevation = 2.000(Ft.)
Slope = 0.02222 s(%)= 2.22
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 3.937 min.
Rainfall intensity = 7.095(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.897
Subarea runoff = 0.828(CFS)
Total initial stream area = 0.130(Ac.)

+++++
+++++ Process from Point/Station 153.500 to Point/Station

153.000

**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.500(Ft.)
Downstream point/station elevation = 49.300(Ft.)
Pipe length = 25.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 0.828(CFS)
Nearest computed pipe diameter = 9.00(In.)
Calculated individual pipe flow = 0.828(CFS)
Normal flow depth in pipe = 4.81(In.)
Flow top width inside pipe = 8.98(In.)
Critical Depth = 4.99(In.)
Pipe flow velocity = 3.44(Ft/s)
Travel time through pipe = 0.12 min.
Time of concentration (TC) = 4.06 min.

++++

Process from Point/Station 153.500 to Point/Station
153.000

**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 3
Stream flow area = 0.130(Ac.)
Runoff from this stream = 0.828(CFS)
Time of concentration = 4.06 min.
Rainfall intensity = 6.973(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	0.24	1.511	4.69	0.020	6.417
2	0.90	3.855	7.93	0.020	4.751
3	0.13	0.828	4.06	0.020	6.973
Qmax(1) =					
	1.000 *	1.000 *	1.511)	+	
	1.352 *	0.592 *	3.855)	+	
	0.920 *	1.000 *	0.828)	+ =	5.357
Qmax(2) =					
	0.740 *	1.000 *	1.511)	+	
	1.000 *	1.000 *	3.855)	+	
	0.680 *	1.000 *	0.828)	+ =	5.536
Qmax(3) =					
	1.087 *	0.865 *	1.511)	+	
	1.470 *	0.512 *	3.855)	+	
	1.000 *	1.000 *	0.828)	+ =	5.149

Total of 3 streams to confluence:

Flow rates before confluence point:

1.511 3.855 0.828

Maximum flow rates at confluence using above data:

5.357 5.536 5.149

Area of streams before confluence:

0.240 0.900 0.130

Effective area values after confluence:
0.903 1.270 0.798
Results of confluence:
Total flow rate = 5.536(CFS)
Time of concentration = 7.930 min.
Effective stream area after confluence = 1.270(Ac.)
Study area average Pervious fraction(A_p) = 0.100
Study area average soil loss rate(F_m) = 0.020(In/Hr)
Study area total (this main stream) = 1.27(Ac.)

+++++
+++++
154.000 Process from Point/Station 153.000 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 49.300(Ft.)
Downstream point/station elevation = 47.500(Ft.)
Pipe length = 360.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.536(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 5.536(CFS)
Normal flow depth in pipe = 11.58(In.)
Flow top width inside pipe = 17.24(In.)
Critical Depth = 10.88(In.)
Pipe flow velocity = 4.61(Ft/s)
Travel time through pipe = 1.30 min.
Time of concentration (TC) = 9.23 min.

+++++
+++++
154.000 Process from Point/Station 153.000 to Point/Station
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 1.270(Ac.)
Runoff from this stream = 5.536(CFS)
Time of concentration = 9.23 min.
Rainfall intensity = 4.354(In/Hr)
Area averaged loss rate (F_m) = 0.0200(In/Hr)
Area averaged Pervious ratio (A_p) = 0.1000

+++++
+++++
154.200 Process from Point/Station 154.100 to Point/Station
***** INITIAL AREA EVALUATION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00

Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 460.000 (Ft.)
Top (of initial area) elevation = 56.300 (Ft.)
Bottom (of initial area) elevation = 54.000 (Ft.)
Difference in elevation = 2.300 (Ft.)
Slope = 0.00500 s(%) = 0.50
TC = $k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 10.190 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 4.115 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 10.466 (CFS)
Total initial stream area = 2.840 (Ac.)

+++++
+++++ Process from Point/Station 154.200 to Point/Station
154.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.500 (Ft.)
Downstream point/station elevation = 47.500 (Ft.)
Pipe length = 25.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 10.466 (CFS)
Nearest computed pipe diameter = 15.00 (In.)
Calculated individual pipe flow = 10.466 (CFS)
Normal flow depth in pipe = 8.14 (In.)
Flow top width inside pipe = 14.95 (In.)
Critical depth could not be calculated.
Pipe flow velocity = 15.39 (Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 10.22 min.

+++++
+++++ Process from Point/Station 154.200 to Point/Station
154.000 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 2.840 (Ac.)
Runoff from this stream = 10.466 (CFS)
Time of concentration = 10.22 min.
Rainfall intensity = 4.108 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++++ Process from Point/Station 154.300 to Point/Station
154.400 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 365.000 (Ft.)
Top (of initial area) elevation = 55.300 (Ft.)
Bottom (of initial area) elevation = 53.500 (Ft.)
Difference in elevation = 1.800 (Ft.)
Slope = 0.00493 s(%)= 0.49
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.315 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 4.332 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 6.869 (CFS)
Total initial stream area = 1.770 (Ac.)

+++++
+++++ Process from Point/Station 154.400 to Point/Station
154.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.500 (Ft.)
Downstream point/station elevation = 47.500 (Ft.)
Pipe length = 25.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 6.869 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 6.869 (CFS)
Normal flow depth in pipe = 7.27 (In.)
Flow top width inside pipe = 11.73 (In.)
Critical depth could not be calculated.
Pipe flow velocity = 13.80 (Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 9.35 min.

+++++
+++++ Process from Point/Station 154.400 to Point/Station
154.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 3
Stream flow area = 1.770 (Ac.)
Runoff from this stream = 6.869 (CFS)
Time of concentration = 9.35 min.
Rainfall intensity = 4.324 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	1.27	5.536	9.23	0.020	4.354
2	2.84	10.466	10.22	0.020	4.108
3	1.77	6.869	9.35	0.020	4.324
Qmax(1) = 1.000 * 1.000 * 5.536) + 1.060 * 0.904 * 10.466) + 1.007 * 0.988 * 6.869) + = 22.394					
Qmax(2) = 0.943 * 1.000 * 5.536) + 1.000 * 1.000 * 10.466) + 0.950 * 1.000 * 6.869) + = 22.212					
Qmax(3) = 0.993 * 1.000 * 5.536) + 1.053 * 0.915 * 10.466) + 1.000 * 1.000 * 6.869) + = 22.442					

Total of 3 streams to confluence:

Flow rates before confluence point:

5.536 10.466 6.869

Maximum flow rates at confluence using above data:

22.394 22.212 22.442

Area of streams before confluence:

1.270 2.840 1.770

Effective area values after confluence:

5.585 5.880 5.638

Results of confluence:

Total flow rate = 22.442(CFS)

Time of concentration = 9.345 min.

Effective stream area after confluence = 5.638 (Ac.)

Study area average Pervious fraction(A_p) = 0.100

Study area average soil loss rate(Fm) = 0.020 (In/Hr)

Study area total (this main stream) = 5.88 (Ac.)

+++++
+++++
Process from Point/Station 154.000 to Point/Station
103.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 47.500(Ft.)
 Downstream point/station elevation = 46.200(Ft.)
 Pipe length = 265.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 22.442(CFS)
 Nearest computed pipe diameter = 30.00 (In.)
 Calculated individual pipe flow = 22.442(CFS)
 Normal flow depth in pipe = 19.95 (In.)
 Flow top width inside pipe = 28.32 (In.)
 Critical Depth = 19.34 (In.)
 Pipe flow velocity = 6.47 (Ft/s)
 Travel time through pipe = 0.68 min.
 Time of concentration (TC) = 10.03 min.

+++++
+++++

++++
Process from Point/Station 154.000 to Point/Station
103.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2
Stream flow area = 5.638(Ac.)
Runoff from this stream = 22.442(CFS)
Time of concentration = 10.03 min.
Rainfall intensity = 4.153(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	2.69	10.403	9.75	0.065	4.219
2	5.64	22.442	10.03	0.020	4.153
Qmax(1) =					
	1.000 *	1.000 *	10.403)	+	
	1.016 *	0.973 *	22.442)	+ =	32.583
Qmax(2) =					
	0.984 *	1.000 *	10.403)	+	
	1.000 *	1.000 *	22.442)	+ =	32.679

Total of 2 main streams to confluence:

Flow rates before confluence point:
11.403 23.442

Maximum flow rates at confluence using above data:
32.583 32.679

Area of streams before confluence:
2.694 5.638

Effective area values after confluence:
8.177 8.332

Results of confluence:

Total flow rate = 32.679(CFS)
Time of concentration = 10.028 min.
Effective stream area after confluence = 8.332(Ac.)
Study area average Pervious fraction(Ap) = 0.173
Study area average soil loss rate(Fm) = 0.035(In/Hr)
Study area total = 8.33(Ac.)

++++
Process from Point/Station 103.000 to Point/Station
104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 46.200(Ft.)
Downstream point/station elevation = 45.500(Ft.)
Pipe length = 145.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 32.679(CFS)
Nearest computed pipe diameter = 33.00(In.)

Calculated individual pipe flow = 32.679(CFS)
Normal flow depth in pipe = 24.23(In.)
Flow top width inside pipe = 29.15(In.)
Critical Depth = 22.82(In.)
Pipe flow velocity = 6.99(Ft/s)
Travel time through pipe = 0.35 min.
Time of concentration (TC) = 10.37 min.

+++++
+++ Process from Point/Station 103.000 to Point/Station
104.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 8.332(Ac.)
Runoff from this stream = 32.679(CFS)
Time of concentration = 10.37 min.
Rainfall intensity = 4.073(In/Hr)
Area averaged loss rate (Fm) = 0.0345(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1727
Program is now starting with Main Stream No. 2

+++++
+++ Process from Point/Station 104.100 to Point/Station
104.200
**** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.170(In/Hr)
Initial subarea data:
Initial area flow distance = 160.000(Ft.)
Top (of initial area) elevation = 56.000(Ft.)
Bottom (of initial area) elevation = 53.500(Ft.)
Difference in elevation = 2.500(Ft.)
Slope = 0.01563 s(%)= 1.56
TC = k(0.483)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.450 min.
Rainfall intensity = 4.581(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.867
Subarea runoff = 1.151(CFS)
Total initial stream area = 0.290(Ac.)

+++++
+++ Process from Point/Station 104.100 to Point/Station
104.200
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 0.290(Ac.)
Runoff from this stream = 1.151(CFS)
Time of concentration = 8.45 min.
Rainfall intensity = 4.581(In/Hr)
Area averaged loss rate (Fm) = 0.1700(In/Hr)
Area averaged Pervious ratio (Ap) = 0.8500

+++++
+++++
104.200 Process from Point/Station 104.300 to Point/Station
***** INITIAL AREA EVALUATION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 420.000(Ft.)
Top (of initial area) elevation = 57.200(Ft.)
Bottom (of initial area) elevation = 53.500(Ft.)
Difference in elevation = 3.700(Ft.)
Slope = 0.00881 s(%)= 0.88
TC = $k(0.304)*[(length^3)/(elevation change)]^{0.2}$
Initial area time of concentration = 8.774 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084(Ft.)
for this Development Type
Rainfall intensity = 4.483(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 3.736(CFS)
Total initial stream area = 0.930(Ac.)

+++++
+++++
104.200 Process from Point/Station 104.300 to Point/Station
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 0.930(Ac.)
Runoff from this stream = 3.736(CFS)
Time of concentration = 8.77 min.
Rainfall intensity = 4.483(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
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1	0.29	1.151	8.45	0.170	4.581
2	0.93	3.736	8.77	0.020	4.483
Qmax(1) =					
	1.000 *	1.000 *	1.151)	+	
	1.022 *	0.963 *	3.736)	+=	4.827
Qmax(2) =					
	0.978 *	1.000 *	1.151)	+	
	1.000 *	1.000 *	3.736)	+=	4.861

Total of 2 streams to confluence:

Flow rates before confluence point:

1.151	3.736
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Maximum flow rates at confluence using above data:

4.827	4.861
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Area of streams before confluence:

0.290	0.930
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Effective area values after confluence:

1.186	1.220
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Results of confluence:

Total flow rate = 4.861(CFS)

Time of concentration = 8.774 min.

Effective stream area after confluence = 1.220(Ac.)

Study area average Pervious fraction(A_p) = 0.278

Study area average soil loss rate(F_m) = 0.056(In/Hr)

Study area total (this main stream) = 1.22(Ac.)

++++++
+++++ Process from Point/Station 104.200 to Point/Station
104.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.500(Ft.)
 Downstream point/station elevation = 45.500(Ft.)
 Pipe length = 25.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 4.861(CFS)
 Nearest computed pipe diameter = 9.00(In.)
 Calculated individual pipe flow = 4.861(CFS)
 Normal flow depth in pipe = 5.73(In.)
 Flow top width inside pipe = 8.66(In.)
 Critical depth could not be calculated.
 Pipe flow velocity = 16.37(Ft/s)
 Travel time through pipe = 0.03 min.
 Time of concentration (TC) = 8.80 min.

+++++
+++++ Process from Point/Station 104.200 to Point/Station
104.000 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:

In Main Stream number: 2

Stream flow area = 1.220(Ac.)

Runoff from this stream = 4.861(CFS)

Time of concentration = 8.80 min.

Rainfall intensity = 4.476 (In/Hr)
Area averaged loss rate (Fm) = 0.0557 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.2783
Program is now starting with Main Stream No. 3

+++++
+++++ Process from Point/Station 104.400 to Point/Station
104.500 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 160.000 (Ft.)
Top (of initial area) elevation = 56.000 (Ft.)
Bottom (of initial area) elevation = 53.500 (Ft.)
Difference in elevation = 2.500 (Ft.)
Slope = 0.01563 s(%)= 1.56
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 5.318 min.
Rainfall intensity = 5.972 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.897
Subarea runoff = 0.643 (CFS)
Total initial stream area = 0.120 (Ac.)

+++++
+++++ Process from Point/Station 104.400 to Point/Station
104.500 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 3 in normal stream number 1
Stream flow area = 0.120 (Ac.)
Runoff from this stream = 0.643 (CFS)
Time of concentration = 5.32 min.
Rainfall intensity = 5.972 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++++ Process from Point/Station 104.600 to Point/Station
104.500 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 1.000
 SCS curve number for soil(AMC 2) = 75.00
 Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
 Max Catchment Loss (Fm) = 0.020 (In/Hr)
 Initial subarea data:
 Initial area flow distance = 265.000 (Ft.)
 Top (of initial area) elevation = 55.800 (Ft.)
 Bottom (of initial area) elevation = 53.500 (Ft.)
 Difference in elevation = 2.300 (Ft.)
 Slope = 0.00868 s(%)= 0.87
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
 Initial area time of concentration = 7.319 min.
 Rainfall intensity = 4.974 (In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
 Subarea runoff = 1.917 (CFS)
 Total initial stream area = 0.430 (Ac.)

++++++
 ++++ Process from Point/Station 104.600 to Point/Station
 104.500
 ***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 3 in normal stream number 2
 Stream flow area = 0.430 (Ac.)
 Runoff from this stream = 1.917 (CFS)
 Time of concentration = 7.32 min.
 Rainfall intensity = 4.974 (In/Hr)
 Area averaged loss rate (Fm) = 0.0200 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	0.12	0.643	5.32	0.020	5.972
2	0.43	1.917	7.32	0.020	4.974
Qmax(1) =					
1.000 * 1.000 * 0.643) +					
1.202 * 0.727 * 1.917) + = 2.317					
Qmax(2) =					
0.832 * 1.000 * 0.643) +					
1.000 * 1.000 * 1.917) + = 2.452					

Total of 2 streams to confluence:
 Flow rates before confluence point:
 0.643 1.917
 Maximum flow rates at confluence using above data:
 2.317 2.452
 Area of streams before confluence:
 0.120 0.430
 Effective area values after confluence:
 0.432 0.550
 Results of confluence:
 Total flow rate = 2.452 (CFS)
 Time of concentration = 7.319 min.
 Effective stream area after confluence = 0.550 (Ac.)

Study area average Pervious fraction(*Ap*) = 0.100
Study area average soil loss rate(*Fm*) = 0.020 (In/Hr)
Study area total (this main stream) = 0.55 (Ac.)

+++++
+++++ Process from Point/Station 104.500 to Point/Station
104.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 49.500 (Ft.)
Downstream point/station elevation = 45.500 (Ft.)
Pipe length = 25.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.452 (CFS)
Nearest computed pipe diameter = 9.00 (In.)
Calculated individual pipe flow = 2.452 (CFS)
Normal flow depth in pipe = 3.79 (In.)
Flow top width inside pipe = 8.89 (In.)
Critical Depth = 8.26 (In.)
Pipe flow velocity = 13.86 (Ft/s)
Travel time through pipe = 0.03 min.
Time of concentration (TC) = 7.35 min.

+++++
+++++ Process from Point/Station 104.500 to Point/Station
104.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 3
Stream flow area = 0.550 (Ac.)
Runoff from this stream = 2.452 (CFS)
Time of concentration = 7.35 min.
Rainfall intensity = 4.962 (In/Hr)
Area averaged loss rate (*Fm*) = 0.0200 (In/Hr)
Area averaged Pervious ratio (*Ap*) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	8.33	32.679	10.37	0.035	4.073
2	1.22	4.861	8.80	0.056	4.476
3	0.55	2.452	7.35	0.020	4.962

Qmax(1) =
1.000 * 1.000 * 32.679) +
0.909 * 1.000 * 4.861) +
0.820 * 1.000 * 2.452) + = 39.108
Qmax(2) =
1.100 * 0.848 * 32.679) +
1.000 * 1.000 * 4.861) +
0.902 * 1.000 * 2.452) + = 37.556
Qmax(3) =
1.220 * 0.708 * 32.679) +
1.110 * 0.835 * 4.861) +

1.000 * 1.000 * 2.452) + = 35.209

Total of 3 main streams to confluence:

Flow rates before confluence point:

33.679 5.861 3.452

Maximum flow rates at confluence using above data:

39.108 37.556 35.209

Area of streams before confluence:

8.332 1.220 0.550

Effective area values after confluence:

10.102 8.837 7.472

Results of confluence:

Total flow rate = 39.108(CFS)

Time of concentration = 10.373 min.

Effective stream area after confluence = 10.102(Ac.)

Study area average Pervious fraction(A_p) = 0.181

Study area average soil loss rate(F_m) = 0.036(In/Hr)

Study area total = 10.10(Ac.)

+++++

**** Process from Point/Station 104.000 to Point/Station
105.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 45.500(Ft.)

Downstream point/station elevation = 45.000(Ft.)

Pipe length = 100.00(Ft.) Manning's N = 0.013

No. of pipes = 1 Required pipe flow = 39.108(CFS)

Nearest computed pipe diameter = 36.00(In.)

Calculated individual pipe flow = 39.108(CFS)

Normal flow depth in pipe = 25.02(In.)

Flow top width inside pipe = 33.15(In.)

Critical Depth = 24.44(In.)

Pipe flow velocity = 7.46(Ft/s)

Travel time through pipe = 0.22 min.

Time of concentration (TC) = 10.60 min.

+++++

**** Process from Point/Station 105.100 to Point/Station
105.000 **** SUBAREA FLOW ADDITION ****

COMMERCIAL subarea type

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 0.000

Decimal fraction soil group C = 0.000

Decimal fraction soil group D = 1.000

SCS curve number for soil(AMC 2) = 75.00

Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.200(In/Hr)

Max Catchment Loss (F_m) = 0.020(In/Hr)

Time of concentration = 10.60 min.

Rainfall intensity = 4.023(In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area, (total area with

modified

rational method) (Q=KCIA) is C = 0.892
Subarea runoff = 1.140(CFS) for 1.110(Ac.)
Total runoff = 40.248(CFS) Total area = 11.21(Ac.)
Area averaged Fm value = 0.035(In/Hr)

+++++

Process from Point/Station 105.000 to Point/Station
106.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 45.000(Ft.)
Downstream point/station elevation = 43.700(Ft.)
Pipe length = 105.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 40.248(CFS)
Nearest computed pipe diameter = 30.00(In.)
Calculated individual pipe flow = 40.248(CFS)
Normal flow depth in pipe = 21.88(In.)
Flow top width inside pipe = 26.66(In.)
Critical Depth = 25.62(In.)
Pipe flow velocity = 10.49(Ft/s)
Travel time through pipe = 0.17 min.
Time of concentration (TC) = 10.76 min.

+++++

Process from Point/Station 105.000 to Point/Station
106.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 11.212(Ac.)
Runoff from this stream = 40.248(CFS)
Time of concentration = 10.76 min.
Rainfall intensity = 3.987(In/Hr)
Area averaged loss rate (Fm) = 0.0347(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1734
Program is now starting with Main Stream No. 2

+++++

Process from Point/Station 106.100 to Point/Station
106.200
**** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp)= 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.170(In/Hr)

Initial subarea data:
Initial area flow distance = 265.000(Ft.)
Top (of initial area) elevation = 56.000(Ft.)
Bottom (of initial area) elevation = 54.300(Ft.)
Difference in elevation = 1.700(Ft.)
Slope = 0.00642 s(%)= 0.64
 $TC = k(0.483) * [(length^3)/(elevation change)]^{0.2}$
Initial area time of concentration = 12.354 min.
Rainfall intensity = 3.685(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.858
Subarea runoff = 0.316(CFS)
Total initial stream area = 0.100(Ac.)

+++++
+++++ Process from Point/Station 106.200 to Point/Station
106.300
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 54.300(Ft.)
End of street segment elevation = 50.000(Ft.)
Length of street segment = 450.000(Ft.)
Height of curb above gutter flowline = 6.0(In.)
Width of half street (curb to crown) = 22.000(Ft.)
Distance from crown to crossfall grade break = 18.000(Ft.)
Slope from gutter to grade break (v/hz) = 0.020
Slope from grade break to crown (v/hz) = 0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line = 10.000(Ft.)
Slope from curb to property line (v/hz) = 0.020
Gutter width = 2.000(Ft.)
Gutter hike from flowline = 2.000(In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 0.903(CFS)
Depth of flow = 0.250(Ft.), Average velocity = 1.781(Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 6.164(Ft.)
Flow velocity = 1.78(Ft/s)
Travel time = 4.21 min. TC = 16.56 min.
Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.200(In/Hr)
Max Catchment Loss (F_m) = 0.020(In/Hr)
Rainfall intensity = 3.115(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.886
Subarea runoff = 1.119(CFS) for 0.420(Ac.)
Total runoff = 1.435(CFS) Total area = 0.52(Ac.)
Area averaged F_m value = 0.049(In/Hr)
Street flow at end of street = 1.435(CFS)
Half street flow at end of street = 1.435(CFS)

Depth of flow = 0.282(Ft.), Average velocity = 1.956(Ft/s)
Flow width (from curb towards crown)= 7.790(Ft.)

+++++

Process from Point/Station 106.300 to Point/Station
106.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 46.000(Ft.)
Downstream point/station elevation = 45.700(Ft.)
Pipe length = 45.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 1.435(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 1.435(CFS)
Normal flow depth in pipe = 5.95(In.)
Flow top width inside pipe = 12.00(In.)
Critical Depth = 6.08(In.)
Pipe flow velocity = 3.69(Ft/s)
Travel time through pipe = 0.20 min.
Time of concentration (TC) = 16.77 min.

+++++

Process from Point/Station 106.300 to Point/Station
106.400
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 0.520(Ac.)
Runoff from this stream = 1.435(CFS)
Time of concentration = 16.77 min.
Rainfall intensity = 3.093(In/Hr)
Area averaged loss rate (Fm) = 0.0488(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2442

+++++

Process from Point/Station 106.500 to Point/Station
106.600
**** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.170(In/Hr)
Initial subarea data:
Initial area flow distance = 185.000(Ft.)
Top (of initial area) elevation = 55.000(Ft.)
Bottom (of initial area) elevation = 52.500(Ft.)
Difference in elevation = 2.500(Ft.)

Slope = 0.01351 s(%)= 1.35
TC = $k(0.483) * [(length^3)/(elevation change)]^{0.2}$
Initial area time of concentration = 9.219 min.
Rainfall intensity = 4.358 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.865
Subarea runoff = 1.055 (CFS)
Total initial stream area = 0.280 (Ac.)

+++++
+++
Process from Point/Station 106.600 to Point/Station
106.700
**** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 52.500 (Ft.)
End of street segment elevation = 50.500 (Ft.)
Length of street segment = 270.000 (Ft.)
Height of curb above gutter flowline = 6.0 (In.)
Width of half street (curb to crown) = 22.000 (Ft.)
Distance from crown to crossfall grade break = 18.000 (Ft.)
Slope from gutter to grade break (v/hz) = 0.020
Slope from grade break to crown (v/hz) = 0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line = 30.000 (Ft.)
Slope from curb to property line (v/hz) = 0.020
Gutter width = 2.000 (Ft.)
Gutter hike from flowline = 0.130 (In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 2.270 (CFS)
Depth of flow = 0.192 (Ft.), Average velocity = 1.908 (Ft/s)
Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 11.039 (Ft.)
Flow velocity = 1.91 (Ft/s)
Travel time = 2.36 min. TC = 11.58 min.
Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil (AMC 2) = 75.00
Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Rainfall intensity = 3.825 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.885
Subarea runoff = 2.331 (CFS) for 0.720 (Ac.)
Total runoff = 3.386 (CFS) Total area = 1.00 (Ac.)
Area averaged Fm value = 0.062 (In/Hr)
Street flow at end of street = 3.386 (CFS)
Half street flow at end of street = 3.386 (CFS)
Depth of flow = 0.226 (Ft.), Average velocity = 2.112 (Ft/s)
Flow width (from curb towards crown) = 12.777 (Ft.)

+++++
+++++

++++
Process from Point/Station 106.700 to Point/Station
106.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 46.500(Ft.)
Downstream point/station elevation = 45.700(Ft.)
Pipe length = 40.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 3.386(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 3.386(CFS)
Normal flow depth in pipe = 7.20(In.)
Flow top width inside pipe = 11.76(In.)
Critical Depth = 9.44(In.)
Pipe flow velocity = 6.88(Ft/s)
Travel time through pipe = 0.10 min.
Time of concentration (TC) = 11.67 min.

++++++
++++
Process from Point/Station 106.700 to Point/Station
106.400
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
Stream flow area = 1.000(Ac.)
Runoff from this stream = 3.386(CFS)
Time of concentration = 11.67 min.
Rainfall intensity = 3.806(In/Hr)
Area averaged loss rate (Fm) = 0.0620(In/Hr)
Area averaged Pervious ratio (Ap) = 0.3100

++++++
++++
Process from Point/Station 106.800 to Point/Station
106.900
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.020(In/Hr)
Initial subarea data:
Initial area flow distance = 215.000(Ft.)
Top (of initial area) elevation = 56.000(Ft.)
Bottom (of initial area) elevation = 50.000(Ft.)
Difference in elevation = 6.000(Ft.)
Slope = 0.02791 s(%)= 2.79
 $TC = k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 5.330 min.
Rainfall intensity = 5.965(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.897

Subarea runoff = 5.190 (CFS)
Total initial stream area = 0.970 (Ac.)

+++++
+++
106.400 Process from Point/Station 106.900 to Point/Station
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 46.000 (Ft.)
Downstream point/station elevation = 45.700 (Ft.)
Pipe length = 30.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 5.190 (CFS)
Nearest computed pipe diameter = 15.00 (In.)
Calculated individual pipe flow = 5.190 (CFS)
Normal flow depth in pipe = 10.18 (In.)
Flow top width inside pipe = 14.01 (In.)
Critical Depth = 11.07 (In.)
Pipe flow velocity = 5.85 (Ft/s)
Travel time through pipe = 0.09 min.
Time of concentration (TC) = 5.42 min.

+++++
+++
106.400 Process from Point/Station 106.900 to Point/Station
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 3
Stream flow area = 0.970 (Ac.)
Runoff from this stream = 5.190 (CFS)
Time of concentration = 5.42 min.
Rainfall intensity = 5.911 (In/Hr)
Area averaged loss rate (Fm) = 0.0200 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	0.52	1.435	16.77	0.049	3.093
2	1.00	3.386	11.67	0.062	3.806
3	0.97	5.190	5.42	0.020	5.911
Qmax(1) =					
	1.000 *	1.000 *	1.435)	+	
	0.810 *	1.000 *	3.386)	+	
	0.522 *	1.000 *	5.190)	+ =	6.884
Qmax(2) =					
	1.234 *	0.696 *	1.435)	+	
	1.000 *	1.000 *	3.386)	+	
	0.643 *	1.000 *	5.190)	+ =	7.955
Qmax(3) =					
	1.926 *	0.323 *	1.435)	+	
	1.562 *	0.464 *	3.386)	+	
	1.000 *	1.000 *	5.190)	+ =	8.536

Total of 3 streams to confluence:
 Flow rates before confluence point:
 1.435 3.386 5.190
 Maximum flow rates at confluence using above data:
 6.884 7.955 8.536
 Area of streams before confluence:
 0.520 1.000 0.970
 Effective area values after confluence:
 2.490 2.332 1.602
 Results of confluence:
 Total flow rate = 8.536(CFS)
 Time of concentration = 5.415 min.
 Effective stream area after confluence = 1.602(Ac.)
 Study area average Pervious fraction(A_p) = 0.214
 Study area average soil loss rate(F_m) = 0.043(In/Hr)
 Study area total (this main stream) = 2.49(Ac.)

++++++
 ++++ Process from Point/Station 106.400 to Point/Station
 106.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 45.700(Ft.)
 Downstream point/station elevation = 43.700(Ft.)
 Pipe length = 395.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 8.536(CFS)
 Nearest computed pipe diameter = 21.00(In.)
 Calculated individual pipe flow = 8.536(CFS)
 Normal flow depth in pipe = 13.66(In.)
 Flow top width inside pipe = 20.03(In.)
 Critical Depth = 13.01(In.)
 Pipe flow velocity = 5.15(Ft/s)
 Travel time through pipe = 1.28 min.
 Time of concentration (TC) = 6.69 min.

++++++
 ++++ Process from Point/Station 106.400 to Point/Station
 106.000
 **** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
 In Main Stream number: 2
 Stream flow area = 1.602(Ac.)
 Runoff from this stream = 8.536(CFS)
 Time of concentration = 6.69 min.
 Rainfall intensity = 5.235(In/Hr)
 Area averaged loss rate (F_m) = 0.0429(In/Hr)
 Area averaged Pervious ratio (A_p) = 0.2145
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	F_m (In/Hr)	Rainfall Intensity (In/Hr)
1	11.21	40.248	10.76	0.035	3.987

2	1.60	8.536	6.69	0.043	5.235
$Q_{max}(1) =$					
1.000 *	1.000 *	40.248)	+		
0.760 *	1.000 *	8.536)	+ =	46.733	
$Q_{max}(2) =$					
1.316 *	0.622 *	40.248)	+		
1.000 *	1.000 *	8.536)	+ =	41.462	

Total of 2 main streams to confluence:

Flow rates before confluence point:

41.248	9.536
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Maximum flow rates at confluence using above data:

46.733	41.462
--------	--------

Area of streams before confluence:

11.212	1.602
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Effective area values after confluence:

12.814	8.573
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Results of confluence:

Total flow rate = 46.733(CFS)

Time of concentration = 10.764 min.

Effective stream area after confluence = 12.814(Ac.)

Study area average Pervious fraction(A_p) = 0.179

Study area average soil loss rate(F_m) = 0.036(In/Hr)

Study area total = 12.81(Ac.)

++++++

Process from Point/Station 106.000 to Point/Station
107.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 43.700(Ft.)
 Downstream point/station elevation = 41.800(Ft.)
 Pipe length = 370.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 46.733(CFS)
 Nearest computed pipe diameter = 36.00(In.)
 Calculated individual pipe flow = 46.733(CFS)
 Normal flow depth in pipe = 28.81(In.)
 Flow top width inside pipe = 28.79(In.)
 Critical Depth = 26.72(In.)
 Pipe flow velocity = 7.71(Ft/s)
 Travel time through pipe = 0.80 min.
 Time of concentration (TC) = 11.56 min.

+++++

Process from Point/Station 107.100 to Point/Station
107.000
**** SUBAREA FLOW ADDITION ****

PARK subarea
 Decimal fraction soil group A = 0.000
 Decimal fraction soil group B = 0.170
 Decimal fraction soil group C = 0.000
 Decimal fraction soil group D = 0.830

SCS curve number for soil (AMC 2) = 71.77
Pervious ratio (Ap) = 0.8500 Max loss rate (Fp) = 0.217 (In/Hr)
Max Catchment Loss (Fm) = 0.184 (In/Hr)
The area added to the existing stream with this TC
does not add flow per Para 6b, Page D-15 of the OCHM,
therefore the upstream flow rate of Q = 46.733 (CFS) is being
used
Time of concentration = 11.56 min.
Rainfall intensity = 3.827 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with
modified
rational method) (Q=KCIA) is C = 0.891
Subarea runoff = 0.000 (CFS) for 0.290 (Ac.)
Total runoff = 46.733 (CFS) Total area = 13.10 (Ac.)
Area averaged Fm value = 0.039 (In/Hr)

++++++
+++ Process from Point/Station 107.000 to Point/Station
107.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 13.104 (Ac.)
Runoff from this stream = 46.733 (CFS)
Time of concentration = 11.56 min.
Rainfall intensity = 3.827 (In/Hr)
Area averaged loss rate (Fm) = 0.0390 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1934
Program is now starting with Main Stream No. 2

++++++
+++ Process from Point/Station 108.100 to Point/Station
108.200
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.180
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.820
SCS curve number for soil (AMC 2) = 71.58
Pervious ratio (Ap) = 0.1000 Max loss rate (Fp) = 0.218 (In/Hr)
Max Catchment Loss (Fm) = 0.022 (In/Hr)
Initial subarea data:
Initial area flow distance = 320.000 (Ft.)
Top (of initial area) elevation = 55.500 (Ft.)
Bottom (of initial area) elevation = 51.500 (Ft.)
Difference in elevation = 4.000 (Ft.)
Slope = 0.01250 s(%) = 1.25
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 7.338 min.
Rainfall intensity = 4.966 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 8.277 (CFS)

Total initial stream area = 1.860(Ac.)

+++++
+++++ Process from Point/Station 108.200 to Point/Station
108.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 47.500(Ft.)
Downstream point/station elevation = 47.200(Ft.)
Pipe length = 25.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.277(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 8.277(CFS)
Normal flow depth in pipe = 11.30(In.)
Flow top width inside pipe = 17.40(In.)
Critical Depth = 13.37(In.)
Pipe flow velocity = 7.09(Ft/s)
Travel time through pipe = 0.06 min.
Time of concentration (TC) = 7.40 min.

+++++
+++++ Process from Point/Station 108.200 to Point/Station
108.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 1.860(Ac.)
Runoff from this stream = 8.277(CFS)
Time of concentration = 7.40 min.
Rainfall intensity = 4.944(In/Hr)
Area averaged loss rate (Fm) = 0.0218(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++++ Process from Point/Station 108.300 to Point/Station
108.400
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.400
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.600
SCS curve number for soil(AMC 2) = 67.40
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.240(In/Hr)
Max Catchment Loss (Fm) = 0.024(In/Hr)
Initial subarea data:
Initial area flow distance = 320.000(Ft.)
Top (of initial area) elevation = 55.500(Ft.)
Bottom (of initial area) elevation = 51.500(Ft.)
Difference in elevation = 4.000(Ft.)
Slope = 0.01250 s(%)= 1.25

TC = $k(0.304) * [(\text{length}^3) / (\text{elevation change})]^{0.2}$
 Initial area time of concentration = 7.338 min.
 Rainfall intensity = 4.966 (In/Hr) for a 100.0 year storm
 Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
 Subarea runoff = 6.183 (CFS)
 Total initial stream area = 1.390 (Ac.)

++++++
 ++++ Process from Point/Station 108.400 to Point/Station
 108.000 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 47.500 (Ft.)
 Downstream point/station elevation = 47.200 (Ft.)
 Pipe length = 25.00 (Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 6.183 (CFS)
 Nearest computed pipe diameter = 15.00 (In.)
 Calculated individual pipe flow = 6.183 (CFS)
 Normal flow depth in pipe = 10.86 (In.)
 Flow top width inside pipe = 13.41 (In.)
 Critical Depth = 12.06 (In.)
 Pipe flow velocity = 6.50 (Ft/s)
 Travel time through pipe = 0.06 min.
 Time of concentration (TC) = 7.40 min.

++++++
 ++++ Process from Point/Station 108.400 to Point/Station
 108.000 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
 Stream flow area = 1.390 (Ac.)
 Runoff from this stream = 6.183 (CFS)
 Time of concentration = 7.40 min.
 Rainfall intensity = 4.942 (In/Hr)
 Area averaged loss rate (Fm) = 0.0240 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	------------	-----------------	----------	------------	----------------------------

1	1.86	8.277	7.40	0.022	4.944
2	1.39	6.183	7.40	0.024	4.942
Qmax(1) =					
	1.000 *	1.000 *	8.277)	+	
	1.000 *	0.999 *	6.183)	+ =	14.459
Qmax(2) =					
	1.000 *	1.000 *	8.277)	+	
	1.000 *	1.000 *	6.183)	+ =	14.457

Total of 2 streams to confluence:
 Flow rates before confluence point:
 8.277 6.183

Maximum flow rates at confluence using above data:
 14.459 14.457
 Area of streams before confluence:
 1.860 1.390
 Effective area values after confluence:
 3.249 3.250
 Results of confluence:
 Total flow rate = 14.459(CFS)
 Time of concentration = 7.396 min.
 Effective stream area after confluence = 3.249(Ac.)
 Study area average Pervious fraction(Ap) = 0.100
 Study area average soil loss rate(Fm) = 0.023(In/Hr)
 Study area total (this main stream) = 3.25(Ac.)

++++++
 ++++ Process from Point/Station 108.000 to Point/Station
 107.000
 ***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 47.200(Ft.)
 Downstream point/station elevation = 41.800(Ft.)
 Pipe length = 330.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 14.459(CFS)
 Nearest computed pipe diameter = 21.00(In.)
 Calculated individual pipe flow = 14.459(CFS)
 Normal flow depth in pipe = 13.11(In.)
 Flow top width inside pipe = 20.34(In.)
 Critical Depth = 16.93(In.)
 Pipe flow velocity = 9.15(Ft/s)
 Travel time through pipe = 0.60 min.
 Time of concentration (TC) = 8.00 min.

++++++
 ++++ Process from Point/Station 108.000 to Point/Station
 107.000
 ***** CONFLUENCE OF MAIN STREAMS *****

The following data inside Main Stream is listed:
 In Main Stream number: 2
 Stream flow area = 3.249(Ac.)
 Runoff from this stream = 14.459(CFS)
 Time of concentration = 8.00 min.
 Rainfall intensity = 4.727(In/Hr)
 Area averaged loss rate (Fm) = 0.0227(In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	13.10	46.733	11.56	0.039	3.827
2	3.25	14.459	8.00	0.023	4.727
Qmax(1) = 1.000 * 1.000 * 46.733) +					

Qmax(2) =	0.809 *	1.000 *	14.459) + =	58.424
	1.238 *	0.692 *	46.733) +	
	1.000 *	1.000 *	14.459) + =	54.461

Total of 2 main streams to confluence:

Flow rates before confluence point:

47.733	15.459
--------	--------

Maximum flow rates at confluence using above data:

58.424	54.461
--------	--------

Area of streams before confluence:

13.104	3.249
--------	-------

Effective area values after confluence:

16.353	12.311
--------	--------

Results of confluence:

Total flow rate = 58.424 (CFS)

Time of concentration = 11.564 min.

Effective stream area after confluence = 16.353 (Ac.)

Study area average Pervious fraction(Ap) = 0.175

Study area average soil loss rate(Fm) = 0.036 (In/Hr)

Study area total = 16.35 (Ac.)

+++++
+++++

Process from Point/Station 108.600 to Point/Station
107.000
**** SUBAREA FLOW ADDITION ****

PARK subarea

Decimal fraction soil group A = 0.000

Decimal fraction soil group B = 1.000

Decimal fraction soil group C = 0.000

Decimal fraction soil group D = 0.000

SCS curve number for soil(AMC 2) = 56.00

Pervious ratio(Ap) = 0.8500 Max loss rate(Fp) = 0.300 (In/Hr)

Max Catchment Loss (Fm) = 0.255 (In/Hr)

The area added to the existing stream with this TC
does not add flow per Para 6b, Page D-15 of the OCHM,
therefore the upstream flow rate of Q = 58.424 (CFS) is being
used

Time of concentration = 11.56 min.

Rainfall intensity = 3.827 (In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area, (total area with
modified

rational method) ($Q=KCIA$) is C = 0.891

Subarea runoff = 0.000 (CFS) for 0.180 (Ac.)

Total runoff = 58.424 (CFS) Total area = 16.53 (Ac.)

Area averaged Fm value = 0.038 (In/Hr)

End of computations, total study area = 17.74 (Ac.)

The following figures may

be used for a unit hydrograph study of the same area.

Note: These figures do not consider reduced effective area
effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.183

Area averaged SCS curve number (AMC 2) = 73.8

Orange County Rational Hydrology Program
(Hydrology Manual Date(s) October 1986 & November
1996)

CIVILCADD/CIVILDESIGN Engineering Software, (c) 1989-2004
Version 8.0
Rational Hydrology Study, Date: 11/14/11 File Name:
100288PRB100.roc

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
DEVELOPED CONDITION
AREA B

Program License Serial Number 4014

***** Hydrology Study Control Information *****

Rational hydrology study storm event year is 100.0
Decimal fraction of study above 2000 ft., 600M = 0.0000
English Units Used for input data

+++++
+++++ Process from Point/Station 200.000 to Point/Station
201.000
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 385.000 (Ft.)
Top (of initial area) elevation = 55.500 (Ft.)
Bottom (of initial area) elevation = 52.500 (Ft.)
Difference in elevation = 3.000 (Ft.)
Slope = 0.00779 s(%) = 0.78
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 8.684 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 4.509 (In/Hr) for a 100.0 year storm

Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 4.849(CFS)
Total initial stream area = 1.200(Ac.)

+++++
+++ Process from Point/Station 201.000 to Point/Station
202.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 48.500(Ft.)
Downstream point/station elevation = 48.300(Ft.)
Pipe length = 25.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.849(CFS)
Nearest computed pipe diameter = 15.00(In.)
Calculated individual pipe flow = 4.849(CFS)
Normal flow depth in pipe = 10.52(In.)
Flow top width inside pipe = 13.73(In.)
Critical Depth = 10.71(In.)
Pipe flow velocity = 5.27(Ft/s)
Travel time through pipe = 0.08 min.
Time of concentration (TC) = 8.76 min.

+++++
+++ Process from Point/Station 201.000 to Point/Station
202.000
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 1 in normal stream number 1
Stream flow area = 1.200(Ac.)
Runoff from this stream = 4.849(CFS)
Time of concentration = 8.76 min.
Rainfall intensity = 4.486(In/Hr)
Area averaged loss rate (Fm) = 0.0200(In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++ Process from Point/Station 202.100 to Point/Station
202.200
**** INITIAL AREA EVALUATION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.170(In/Hr)
Initial subarea data:
Initial area flow distance = 285.000(Ft.)
Top (of initial area) elevation = 54.000(Ft.)
Bottom (of initial area) elevation = 52.500(Ft.)

Difference in elevation = 1.500(Ft.)
Slope = 0.00526 s(%)= 0.53
TC = $k(0.483) * [(length^3)/(elevation change)]^{0.2}$
Initial area time of concentration = 13.232 min.
Rainfall intensity = 3.543(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.857
Subarea runoff = 2.975(CFS)
Total initial stream area = 0.980(Ac.)

+++++
+++++ Process from Point/Station 202.300 to Point/Station
202.200
***** SUBAREA FLOW ADDITION *****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.550
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.450
SCS curve number for soil(AMC 2) = 64.55
Pervious ratio(A_p) = 0.1000 Max loss rate(F_p) = 0.255 (In/Hr)
Max Catchment Loss (F_m) = 0.026 (In/Hr)
Time of concentration = 13.23 min.
Rainfall intensity = 3.543(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.868
Subarea runoff = 1.424 (CFS) for 0.450 (Ac.)
Total runoff = 4.399(CFS) Total area = 1.43 (Ac.)
Area averaged F_m value = 0.125 (In/Hr)

+++++
+++++ Process from Point/Station 202.200 to Point/Station
202.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 48.500(Ft.)
Downstream point/station elevation = 48.300(Ft.)
Pipe length = 25.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 4.399(CFS)
Nearest computed pipe diameter = 15.00 (In.)
Calculated individual pipe flow = 4.399(CFS)
Normal flow depth in pipe = 9.79 (In.)
Flow top width inside pipe = 14.28 (In.)
Critical Depth = 10.20 (In.)
Pipe flow velocity = 5.18 (Ft/s)
Travel time through pipe = 0.08 min.
Time of concentration (TC) = 13.31 min.

+++++
+++++ Process from Point/Station 202.200 to Point/Station
202.000
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 1 in normal stream number 2
 Stream flow area = 1.430(Ac.)
 Runoff from this stream = 4.399(CFS)
 Time of concentration = 13.31 min.
 Rainfall intensity = 3.530 (In/Hr)
 Area averaged loss rate (Fm) = 0.1245 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.6140
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	1.20	4.849	8.76	0.020	4.486
2	1.43	4.399	13.31	0.125	3.530
Qmax(1) =					
	1.000 *	1.000 *	4.849) +		
	1.281 *	0.658 *	4.399) + =		8.557
Qmax(2) =					
	0.786 *	1.000 *	4.849) +		
	1.000 *	1.000 *	4.399) + =		8.210

Total of 2 streams to confluence:

Flow rates before confluence point:

4.849 4.399

Maximum flow rates at confluence using above data:

8.557 8.210

Area of streams before confluence:

1.200 1.430

Effective area values after confluence:

2.141 2.630

Results of confluence:

Total flow rate = 8.557(CFS)

Time of concentration = 8.763 min.

Effective stream area after confluence = 2.141(Ac.)

Study area average Pervious fraction(Ap) = 0.379

Study area average soil loss rate(Fm) = 0.077(In/Hr)

Study area total (this main stream) = 2.63(Ac.)

+++++

**** Process from Point/Station 202.000 to Point/Station
 203.000
 **** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 48.300(Ft.)
 Downstream point/station elevation = 47.100(Ft.)
 Pipe length = 225.00(Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 8.557(CFS)
 Nearest computed pipe diameter = 21.00(In.)
 Calculated individual pipe flow = 8.557(CFS)
 Normal flow depth in pipe = 13.44(In.)
 Flow top width inside pipe = 20.16(In.)
 Critical Depth = 13.04(In.)
 Pipe flow velocity = 5.26(Ft/s)
 Travel time through pipe = 0.71 min.
 Time of concentration (TC) = 9.48 min.

+++++
+++ Process from Point/Station 203.100 to Point/Station
203.000
**** SUBAREA FLOW ADDITION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.790
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.210
SCS curve number for soil(AMC 2) = 59.99
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp)= 0.279 (In/Hr)
Max Catchment Loss (Fm) = 0.237 (In/Hr)
Time of concentration = 9.48 min.
Rainfall intensity = 4.290 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.880
Subarea runoff = 0.437 (CFS) for 0.240 (Ac.)
Total runoff = 8.994 (CFS) Total area = 2.38 (Ac.)
Area averaged Fm value = 0.093 (In/Hr)

+++++
+++ Process from Point/Station 203.000 to Point/Station
204.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 47.100 (Ft.)
Downstream point/station elevation = 40.500 (Ft.)
Pipe length = 60.00 (Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 8.994 (CFS)
Nearest computed pipe diameter = 12.00 (In.)
Calculated individual pipe flow = 8.994 (CFS)
Normal flow depth in pipe = 7.83 (In.)
Flow top width inside pipe = 11.43 (In.)
Critical depth could not be calculated.
Pipe flow velocity = 16.56 (Ft/s)
Travel time through pipe = 0.06 min.
Time of concentration (TC) = 9.54 min.

+++++
+++ Process from Point/Station 203.000 to Point/Station
204.000
**** CONFLUENCE OF MAIN STREAMS ****

The following data inside Main Stream is listed:
In Main Stream number: 1
Stream flow area = 2.381 (Ac.)
Runoff from this stream = 8.994 (CFS)
Time of concentration = 9.54 min.
Rainfall intensity = 4.274 (In/Hr)

Area averaged loss rate (Fm) = 0.0930 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.4269
Program is now starting with Main Stream No. 2

+++++
+++++ Process from Point/Station 205.100 to Point/Station
205.200 **** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.020 (In/Hr)
Initial subarea data:
Initial area flow distance = 370.000 (Ft.)
Top (of initial area) elevation = 57.900 (Ft.)
Bottom (of initial area) elevation = 56.000 (Ft.)
Difference in elevation = 1.900 (Ft.)
Slope = 0.00514 S(%)= 0.51
TC = k(0.304)*[(length^3)/(elevation change)]^0.2
Initial area time of concentration = 9.291 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 4.338 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.896
Subarea runoff = 6.024 (CFS)
Total initial stream area = 1.550 (Ac.)

+++++
+++++ Process from Point/Station 205.200 to Point/Station
205.300 **** STREET FLOW TRAVEL TIME + SUBAREA FLOW ADDITION ****

Top of street segment elevation = 56.000 (Ft.)
End of street segment elevation = 48.500 (Ft.)
Length of street segment = 305.000 (Ft.)
Height of curb above gutter flowline = 6.0 (In.)
Width of half street (curb to crown) = 22.000 (Ft.)
Distance from crown to crossfall grade break = 18.000 (Ft.)
Slope from gutter to grade break (v/hz) = 0.020
Slope from grade break to crown (v/hz) = 0.020
Street flow is on [1] side(s) of the street
Distance from curb to property line = 30.000 (Ft.)
Slope from curb to property line (v/hz) = 0.020
Gutter width = 2.000 (Ft.)
Gutter hike from flowline = 0.130 (In.)
Manning's N in gutter = 0.0150
Manning's N from gutter to grade break = 0.0150
Manning's N from grade break to crown = 0.0150
Estimated mean flow rate at midpoint of street = 7.295 (CFS)
Depth of flow = 0.243 (Ft.), Average velocity = 4.014 (Ft/s)

Streetflow hydraulics at midpoint of street travel:
Halfstreet flow width = 13.588(Ft.)
Flow velocity = 4.01(Ft/s)
Travel time = 1.27 min. TC = 10.56 min.
Adding area flow to street
COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.260
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.740
SCS curve number for soil(AMC 2) = 70.06
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp) = 0.226 (In/Hr)
Max Catchment Loss (Fm) = 0.023 (In/Hr)
Rainfall intensity = 4.032 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.895
Subarea runoff = 2.460(CFS) for 0.800(Ac.)
Total runoff = 8.484(CFS) Total area = 2.35(Ac.)
Area averaged Fm value = 0.021(In/Hr)
Street flow at end of street = 8.484(CFS)
Half street flow at end of street = 8.484(CFS)
Depth of flow = 0.258(Ft.), Average velocity = 4.170(Ft/s)
Flow width (from curb towards crown)= 14.365(Ft.)

+++++
+++++ Process from Point/Station 205.200 to Point/Station
205.300
***** CONFLUENCE OF MINOR STREAMS *****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 2.350(Ac.)
Runoff from this stream = 8.484(CFS)
Time of concentration = 10.56 min.
Rainfall intensity = 4.032 (In/Hr)
Area averaged loss rate (Fm) = 0.0209 (In/Hr)
Area averaged Pervious ratio (Ap) = 0.1000

+++++
+++++ Process from Point/Station 205.310 to Point/Station
205.320
***** INITIAL AREA EVALUATION *****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp) = 0.200 (In/Hr)
Max Catchment Loss (Fm) = 0.170 (In/Hr)
Initial subarea data:
Initial area flow distance = 350.000(Ft.)
Top (of initial area) elevation = 56.000(Ft.)
Bottom (of initial area) elevation = 52.000(Ft.)

Difference in elevation = 4.000(Ft.)
Slope = 0.01143 s(%)= 1.14
TC = $k(0.483) * [(\text{length}^3) / (\text{elevation change})]^{0.2}$
Initial area time of concentration = 12.302 min.
Rainfall intensity = 3.694(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.859
Subarea runoff = 0.729(CFS)
Total initial stream area = 0.230(Ac.)

+++++
+++++
Process from Point/Station 205.320 to Point/Station
205.300
**** IMPROVED CHANNEL TRAVEL TIME ****

Upstream point elevation = 52.000(Ft.)
Downstream point elevation = 48.500(Ft.)
Channel length thru subarea = 560.000(Ft.)
Channel base width = 0.000(Ft.)
Slope or 'Z' of left channel bank = 1.000
Slope or 'Z' of right channel bank = 1.000
Estimated mean flow rate at midpoint of channel = 0.971(CFS)
Manning's 'N' = 0.015
Maximum depth of channel = 1.000(Ft.)
Flow(q) thru subarea = 0.971(CFS)
Depth of flow = 0.593(Ft.), Average velocity = 2.763(Ft/s)
Channel flow top width = 1.186(Ft.)
Flow Velocity = 2.76(Ft/s)
Travel time = 3.38 min.
Time of concentration = 15.68 min.
Critical depth = 0.566(Ft.)
Adding area flow to channel
PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 1.000
SCS curve number for soil(AMC 2) = 75.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp) = 0.200(In/Hr)
Max Catchment Loss (Fm) = 0.170(In/Hr)
Rainfall intensity = 3.214(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.852
Subarea runoff = 0.394(CFS) for 0.180(Ac.)
Total runoff = 1.123(CFS) Total area = 0.41(Ac.)
Area averaged Fm value = 0.170(In/Hr)
Depth of flow = 0.626(Ft.), Average velocity = 2.866(Ft/s)
Critical depth = 0.602(Ft.)

+++++
+++++
Process from Point/Station 205.320 to Point/Station
205.300
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2

Stream flow area = 0.410 (Ac.)
 Runoff from this stream = 1.123 (CFS)
 Time of concentration = 15.68 min.
 Rainfall intensity = 3.214 (In/Hr)
 Area averaged loss rate (Fm) = 0.1700 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.8500
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	2.35	8.484	10.56	0.021	4.032
2	0.41	1.123	15.68	0.170	3.214
Qmax(1) =					
1.000 * 1.000 * 8.484) +					
1.269 * 0.673 * 1.123) + = 9.443					
Qmax(2) =					
0.796 * 1.000 * 8.484) +					
1.000 * 1.000 * 1.123) + = 7.877					

Total of 2 streams to confluence:
 Flow rates before confluence point:
 8.484 1.123
 Maximum flow rates at confluence using above data:
 9.443 7.877
 Area of streams before confluence:
 2.350 0.410
 Effective area values after confluence:
 2.626 2.760
 Results of confluence:
 Total flow rate = 9.443 (CFS)
 Time of concentration = 10.557 min.
 Effective stream area after confluence = 2.626 (Ac.)
 Study area average Pervious fraction (Ap) = 0.211
 Study area average soil loss rate (Fm) = 0.043 (In/Hr)
 Study area total (this main stream) = 2.76 (Ac.)

++++++
+++++
Process from Point/Station 205.300 to Point/Station
205.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.500 (Ft.)
 Downstream point/station elevation = 44.300 (Ft.)
 Pipe length = 25.00 (Ft.) Manning's N = 0.013
 No. of pipes = 1 Required pipe flow = 9.443 (CFS)
 Nearest computed pipe diameter = 21.00 (In.)
 Calculated individual pipe flow = 9.443 (CFS)
 Normal flow depth in pipe = 12.53 (In.)
 Flow top width inside pipe = 20.60 (In.)
 Critical Depth = 13.73 (In.)
 Pipe flow velocity = 6.31 (Ft/s)
 Travel time through pipe = 0.07 min.
 Time of concentration (TC) = 10.62 min.

++++++

++++
Process from Point/Station 205.300 to Point/Station
205.400
**** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 1
Stream flow area = 2.626(Ac.)
Runoff from this stream = 9.443(CFS)
Time of concentration = 10.62 min.
Rainfall intensity = 4.018(In/Hr)
Area averaged loss rate (Fm) = 0.0430(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2114

++++++
+++++
Process from Point/Station 205.410 to Point/Station
205.420
**** INITIAL AREA EVALUATION ****

COMMERCIAL subarea type
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 0.890
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.110
SCS curve number for soil(AMC 2) = 58.09
Pervious ratio(Ap) = 0.1000 Max loss rate(Fp)= 0.289 (In/Hr)
Max Catchment Loss (Fm) = 0.029 (In/Hr)
Initial subarea data:
Initial area flow distance = 450.000(Ft.)
Top (of initial area) elevation = 54.300(Ft.)
Bottom (of initial area) elevation = 48.500(Ft.)
Difference in elevation = 5.800(Ft.)
Slope = 0.01289 s(%)= 1.29
TC = $k(0.304) * [(length^3) / (elevation change)]^{0.2}$
Initial area time of concentration = 8.358 min.
NOTE: Distance EXCEEDS recommended maximum value of 328.084 (Ft.)
for this Development Type
Rainfall intensity = 4.609(In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area (Q=KCIA) is C = 0.894
Subarea runoff = 2.185(CFS)
Total initial stream area = 0.530(Ac.)

+++++
+++++
Process from Point/Station 205.420 to Point/Station
205.400
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.500(Ft.)
Downstream point/station elevation = 44.300(Ft.)
Pipe length = 25.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 2.185(CFS)
Nearest computed pipe diameter = 12.00(In.)
Calculated individual pipe flow = 2.185(CFS)
Normal flow depth in pipe = 7.30(In.)
Flow top width inside pipe = 11.72(In.)

Critical Depth = 7.58 (In.)
 Pipe flow velocity = 4.37 (Ft/s)
 Travel time through pipe = 0.10 min.
 Time of concentration (TC) = 8.45 min.

++++++
 ++++ Process from Point/Station 205.420 to Point/Station
 205.400
 **** CONFLUENCE OF MINOR STREAMS ****

Along Main Stream number: 2 in normal stream number 2
 Stream flow area = 0.530 (Ac.)
 Runoff from this stream = 2.185 (CFS)
 Time of concentration = 8.45 min.
 Rainfall intensity = 4.579 (In/Hr)
 Area averaged loss rate (Fm) = 0.0289 (In/Hr)
 Area averaged Pervious ratio (Ap) = 0.1000
 Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
1	2.63	9.443	10.62	0.043	4.018
2	0.53	2.185	8.45	0.029	4.579
Qmax(1) =					
	1.000 *	1.000 *	9.443)	+	
	0.877 *	1.000 *	2.185)	+ =	11.358
Qmax(2) =					
	1.141 *	0.796 *	9.443)	+	
	1.000 *	1.000 *	2.185)	+ =	10.762

Total of 2 streams to confluence:
 Flow rates before confluence point:
 9.443 2.185
 Maximum flow rates at confluence using above data:
 11.358 10.762
 Area of streams before confluence:
 2.626 0.530
 Effective area values after confluence:
 3.156 2.620
 Results of confluence:
 Total flow rate = 11.358 (CFS)
 Time of concentration = 10.623 min.
 Effective stream area after confluence = 3.156 (Ac.)
 Study area average Pervious fraction (Ap) = 0.193
 Study area average soil loss rate (Fm) = 0.041 (In/Hr)
 Study area total (this main stream) = 3.16 (Ac.)

++++++
 ++++ Process from Point/Station 205.400 to Point/Station
 205.500
 *** PIPEFLOW TRAVEL TIME (Program estimated size) ***

Upstream point/station elevation = 44.300 (Ft.)

Downstream point/station elevation = 44.100(Ft.)
Pipe length = 20.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 11.358(CFS)
Nearest computed pipe diameter = 21.00(In.)
Calculated individual pipe flow = 11.358(CFS)
Normal flow depth in pipe = 13.15(In.)
Flow top width inside pipe = 20.32(In.)
Critical Depth = 15.08(In.)
Pipe flow velocity = 7.16(Ft/s)
Travel time through pipe = 0.05 min.
Time of concentration (TC) = 10.67 min.

+++++
+++++ Process from Point/Station 205.510 to Point/Station
205.500
**** SUBAREA FLOW ADDITION ****

PARK subarea
Decimal fraction soil group A = 0.000
Decimal fraction soil group B = 1.000
Decimal fraction soil group C = 0.000
Decimal fraction soil group D = 0.000
SCS curve number for soil(AMC 2) = 56.00
Pervious ratio(Ap) = 0.8500 Max loss rate(Fp) = 0.300 (In/Hr)
Max Catchment Loss (Fm) = 0.255 (In/Hr)
Time of concentration = 10.67 min.
Rainfall intensity = 4.008 (In/Hr) for a 100.0 year storm
Effective runoff coefficient used for area, (total area with modified rational method) (Q=KCIA) is C = 0.889
Subarea runoff = 0.315(CFS) for 0.120(Ac.)
Total runoff = 11.673(CFS) Total area = 3.28(Ac.)
Area averaged Fm value = 0.049 (In/Hr)

+++++
+++++ Process from Point/Station 205.500 to Point/Station
205.000
**** PIPEFLOW TRAVEL TIME (Program estimated size) ****

Upstream point/station elevation = 44.100(Ft.)
Downstream point/station elevation = 42.700(Ft.)
Pipe length = 75.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 11.673(CFS)
Nearest computed pipe diameter = 18.00(In.)
Calculated individual pipe flow = 11.673(CFS)
Normal flow depth in pipe = 12.33(In.)
Flow top width inside pipe = 16.72(In.)
Critical Depth = 15.60(In.)
Pipe flow velocity = 9.05(Ft/s)
Travel time through pipe = 0.14 min.
Time of concentration (TC) = 10.81 min.

+++++
+++++

Process from Point/Station 205.000 to Point/Station
204.500
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 42.700(Ft.)
Downstream point/station elevation = 41.500(Ft.)
Pipe length = 245.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 11.673(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 11.673(CFS)
Normal flow depth in pipe = 15.33(In.)
Flow top width inside pipe = 23.06(In.)
Critical Depth = 14.72(In.)
Pipe flow velocity = 5.51(Ft/s)
Travel time through pipe = 0.74 min.
Time of concentration (TC) = 11.55 min.

+++++
+++
Process from Point/Station 204.500 to Point/Station
204.000
***** PIPEFLOW TRAVEL TIME (Program estimated size) *****

Upstream point/station elevation = 41.500(Ft.)
Downstream point/station elevation = 40.500(Ft.)
Pipe length = 200.00(Ft.) Manning's N = 0.013
No. of pipes = 1 Required pipe flow = 11.673(CFS)
Nearest computed pipe diameter = 24.00(In.)
Calculated individual pipe flow = 11.673(CFS)
Normal flow depth in pipe = 15.22(In.)
Flow top width inside pipe = 23.12(In.)
Critical Depth = 14.72(In.)
Pipe flow velocity = 5.56(Ft/s)
Travel time through pipe = 0.60 min.
Time of concentration (TC) = 12.15 min.

+++++
+++
Process from Point/Station 204.500 to Point/Station
204.000
***** CONFLUENCE OF MAIN STREAMS *****

The following data inside Main Stream is listed:
In Main Stream number: 2
Stream flow area = 3.276(Ac.)
Runoff from this stream = 11.673(CFS)
Time of concentration = 12.15 min.
Rainfall intensity = 3.720(In/Hr)
Area averaged loss rate (Fm) = 0.0485(In/Hr)
Area averaged Pervious ratio (Ap) = 0.2168
Summary of stream data:

Stream No.	Area (Ac.)	Flow rate (CFS)	TC (min)	Fm (In/Hr)	Rainfall Intensity (In/Hr)
------------	------------	-----------------	----------	------------	----------------------------

1	2.38	8.994	9.54	0.093	4.274
2	3.28	11.673	12.15	0.049	3.720
Qmax(1) =					
	1.000 *	1.000 *	8.994)	+	
	1.151 *	0.785 *	11.673)	+ =	19.539
Qmax(2) =					
	0.868 *	1.000 *	8.994)	+	
	1.000 *	1.000 *	11.673)	+ =	19.476

Total of 2 main streams to confluence:

Flow rates before confluence point:

9.994	12.673
-------	--------

Maximum flow rates at confluence using above data:

19.539	19.476
--------	--------

Area of streams before confluence:

2.381	3.276
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Effective area values after confluence:

4.953	5.657
-------	-------

Results of confluence:

Total flow rate = 19.539(CFS)

Time of concentration = 9.536 min.

Effective stream area after confluence = 4.953 (Ac.)

Study area average Pervious fraction(Ap) = 0.305

Study area average soil loss rate(Fm) = 0.067 (In/Hr)

Study area total = 5.66 (Ac.)

End of computations, total study area = 6.28 (Ac.)

The following figures may

be used for a unit hydrograph study of the same area.

Note: These figures do not consider reduced effective area effects caused by confluences in the rational equation.

Area averaged pervious area fraction(Ap) = 0.309

Area averaged SCS curve number (AMC 2) = 71.3

APPENDIX 'E'

Unit Hydrograph Analysis

Existing Condition:

25-Year Storm Event

- Area A
- Area B

100-Year Storm Event

- Area A
- Area B

Developed Condition:

25-Year Storm Event

- Area A
- Area B

100-Year Storm Event

- Area A
- Area B

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Unit Hydrograph Analysis

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Study date 11/14/11 File Name 100288EXA25UH.out

+++++

Orange County Unit Hydrograph Hydrology Method
Manual Date(s) - October 1986, November 1996

Program License Serial Number 4014

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
EXISTING CONDITION
AREA A

Storm Event Year = 25

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

+++++
***** Area-averaged max loss rate, Fm *****

***** Area-averaged adjusted loss rate Fm (In/Hr) = 0.020

***** Area-Averaged low loss rate fraction, Yb *****

SCS curve No. (AMCII)	Area (Ac.)	Area Fraction	Soil Group	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
73.8	18.2	1.00	D	0.200	0.100	0.020

Area-averaged adjusted loss rate Fm (In/Hr) = 0.020

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
1.82	0.100	73.8	73.8	3.55	0.434
16.36	0.900	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.896

Area-averaged low loss fraction, Yb = 0.104

+++++
User entry of time of concentration = 0.144 (hours)

Watershed area = 18.18(Ac.)

Catchment Lag time = 0.115 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 72.3380

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.020(In/Hr)

Average low loss rate fraction (Yb) = 0.104 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.400(In)

Computed peak 30-minute rainfall = 0.870(In)

Specified peak 1-hour rainfall = 1.150(In)

Computed peak 3-hour rainfall = 1.940(In)

Specified peak 6-hour rainfall = 2.710(In)

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 Specified peak 24-hour rainfall = 4.490(In)

Rainfall depth area reduction factors:
 Using a total area of 18.18(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999	Adjusted rainfall = 0.400(In)
30-minute factor = 0.999	Adjusted rainfall = 0.869(In)
1-hour factor = 0.999	Adjusted rainfall = 1.149(In)
3-hour factor = 1.000	Adjusted rainfall = 1.940(In)
6-hour factor = 1.000	Adjusted rainfall = 2.710(In)
24-hour factor = 1.000	Adjusted rainfall = 4.490(In)

Unit Hydrograph
 ++++++
 Interval 'S' Graph Unit Hydrograph
 Number Mean values ((CFS))

(K = 219.86 (CFS))

1	9.344	20.543
2	55.996	102.572
3	90.659	76.212
4	98.201	16.582
5	100.000	3.955

Total soil rain loss = 0.30(In)
 Total effective rainfall = 4.18(In)
 Peak flow rate in flood hydrograph = 55.08(CFS)

24 - H O U R S T O R M
 Run off Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	volume Ac.Ft	Q(CFS)	0	15.0	30.0	45.0	60.0
0+ 5	0.0007	0.10	Q				
0+10	0.0050	0.63	Q				
0+15	0.0120	1.02	Q				
0+20	0.0197	1.11	Q				
0+25	0.0274	1.13	Q				
0+30	0.0352	1.13	Q				
0+35	0.0431	1.14	Q				
0+40	0.0509	1.14	Q				
0+45	0.0588	1.14	Q				
0+50	0.0667	1.15	Q				
0+55	0.0746	1.15	Q				
1+ 0	0.0826	1.16	Q				
1+ 5	0.0906	1.16	Q				
1+10	0.0986	1.16	Q				
1+15	0.1067	1.17	Q				
1+20	0.1147	1.17	Q				
1+25	0.1228	1.18	Q				
1+30	0.1310	1.18	Q				
1+35	0.1391	1.19	Q				
1+40	0.1473	1.19	Q				
1+45	0.1556	1.19	Q				
1+50	0.1638	1.20	QV				
1+55	0.1721	1.20	QV				
2+ 0	0.1804	1.21	QV				

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2+ 5	0.1888	1.21	QV
2+10	0.1971	1.22	QV
2+15	0.2056	1.22	QV
2+20	0.2140	1.23	QV
2+25	0.2225	1.23	QV
2+30	0.2310	1.24	QV
2+35	0.2395	1.24	QV
2+40	0.2481	1.25	QV
2+45	0.2567	1.25	QV
2+50	0.2654	1.25	QV
2+55	0.2740	1.26	QV
3+ 0	0.2827	1.26	QV
3+ 5	0.2915	1.27	QV
3+10	0.3003	1.28	QV
3+15	0.3091	1.28	QV
3+20	0.3179	1.29	Q V
3+25	0.3268	1.29	Q V
3+30	0.3358	1.30	Q V
3+35	0.3447	1.30	Q V
3+40	0.3537	1.31	Q V
3+45	0.3628	1.31	Q V
3+50	0.3719	1.32	Q V
3+55	0.3810	1.32	Q V
4+ 0	0.3901	1.33	Q V
4+ 5	0.3993	1.34	Q V
4+10	0.4086	1.34	Q V
4+15	0.4178	1.35	Q V
4+20	0.4272	1.35	Q V
4+25	0.4365	1.36	Q V
4+30	0.4459	1.37	Q V
4+35	0.4554	1.37	Q V
4+40	0.4649	1.38	Q V
4+45	0.4744	1.38	Q V
4+50	0.4840	1.39	Q V
4+55	0.4936	1.40	Q V
5+ 0	0.5033	1.40	Q V
5+ 5	0.5130	1.41	Q V
5+10	0.5228	1.42	Q V
5+15	0.5326	1.42	Q V
5+20	0.5425	1.43	Q V
5+25	0.5524	1.44	Q V
5+30	0.5623	1.45	Q V
5+35	0.5723	1.45	Q V
5+40	0.5824	1.46	Q V
5+45	0.5925	1.47	Q V
5+50	0.6026	1.48	Q V
5+55	0.6129	1.48	Q V
6+ 0	0.6231	1.49	Q V
6+ 5	0.6334	1.50	Q V
6+10	0.6438	1.51	Q V
6+15	0.6542	1.51	Q V
6+20	0.6647	1.52	Q V
6+25	0.6753	1.53	Q V
6+30	0.6859	1.54	Q V
6+35	0.6965	1.55	Q V
6+40	0.7072	1.56	Q V
6+45	0.7180	1.56	Q V
6+50	0.7288	1.57	Q V
6+55	0.7397	1.58	Q V
7+ 0	0.7507	1.59	Q V
7+ 5	0.7617	1.60	Q V
7+10	0.7728	1.61	Q V
7+15	0.7840	1.62	Q V
7+20	0.7952	1.63	Q V
7+25	0.8065	1.64	Q V
7+30	0.8178	1.65	Q V

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7+35	0.8293	1.66	Q	V			
7+40	0.8408	1.67	Q	V			
7+45	0.8523	1.68	Q	V			
7+50	0.8640	1.69	Q	V			
7+55	0.8757	1.70	Q	V			
8+ 0	0.8875	1.71	Q	V			
8+ 5	0.8994	1.72	Q	V			
8+10	0.9113	1.74	Q	V			
8+15	0.9234	1.75	Q	V			
8+20	0.9355	1.76	Q	V			
8+25	0.9477	1.77	Q	V			
8+30	0.9599	1.78	Q	V			
8+35	0.9723	1.79	Q	V			
8+40	0.9847	1.81	Q	V			
8+45	0.9973	1.82	Q	V			
8+50	1.0099	1.83	Q	V			
8+55	1.0226	1.85	Q	V			
9+ 0	1.0354	1.86	Q	V			
9+ 5	1.0483	1.87	Q	V			
9+10	1.0613	1.89	Q	V			
9+15	1.0745	1.90	Q	V			
9+20	1.0877	1.92	Q	V			
9+25	1.1010	1.93	Q	V			
9+30	1.1144	1.95	Q	V			
9+35	1.1279	1.96	Q	V			
9+40	1.1415	1.98	Q	V			
9+45	1.1553	2.00	Q	V			
9+50	1.1691	2.01	Q	V			
9+55	1.1831	2.03	Q	V			
10+ 0	1.1972	2.05	Q	V			
10+ 5	1.2114	2.06	Q	V			
10+10	1.2257	2.08	Q	V			
10+15	1.2402	2.10	Q	V			
10+20	1.2548	2.12	Q	V			
10+25	1.2695	2.14	Q	V			
10+30	1.2844	2.16	Q	V			
10+35	1.2994	2.18	Q	V			
10+40	1.3146	2.20	Q	V			
10+45	1.3299	2.22	Q	V			
10+50	1.3453	2.24	Q	V			
10+55	1.3609	2.27	Q	V			
11+ 0	1.3767	2.29	Q	V			
11+ 5	1.3926	2.31	Q	V			
11+10	1.4087	2.34	Q	V			
11+15	1.4250	2.36	Q	V			
11+20	1.4414	2.39	Q	V			
11+25	1.4580	2.41	Q	V			
11+30	1.4748	2.44	Q	V			
11+35	1.4918	2.47	Q	V			
11+40	1.5090	2.50	Q	V			
11+45	1.5265	2.53	Q	V			
11+50	1.5441	2.56	Q	V			
11+55	1.5619	2.59	Q	V			
12+ 0	1.5800	2.62	Q	V			
12+ 5	1.5989	2.74	Q	V			
12+10	1.6210	3.21	Q	V			
12+15	1.6456	3.57	Q	V			
12+20	1.6709	3.69	Q	V			
12+25	1.6967	3.75	Q	V			
12+30	1.7229	3.80	Q	V			
12+35	1.7493	3.84	Q	V			
12+40	1.7762	3.90	Q	V			
12+45	1.8034	3.95	Q	V			
12+50	1.8310	4.00	Q	V			
12+55	1.8589	4.06	Q	V			
13+ 0	1.8873	4.12	Q	V			

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13+ 5	1.9161	4.18	Q	V				
13+10	1.9454	4.25	Q	V				
13+15	1.9751	4.31	Q	V				
13+20	2.0053	4.39	Q	V				
13+25	2.0360	4.46	Q	V				
13+30	2.0672	4.54	Q	V				
13+35	2.0990	4.61	Q	V				
13+40	2.1314	4.70	Q	V				
13+45	2.1644	4.79	Q	V				
13+50	2.1980	4.88	Q	V				
13+55	2.2323	4.98	Q	V				
14+ 0	2.2673	5.09	Q	V				
14+ 5	2.3031	5.19	Q	V				
14+10	2.3394	5.28	Q	V				
14+15	2.3765	5.38	Q	V				
14+20	2.4144	5.51	Q	V				
14+25	2.4533	5.65	Q	V				
14+30	2.4933	5.81	Q	V				
14+35	2.5344	5.97	Q	V				
14+40	2.5768	6.15	Q	V				
14+45	2.6204	6.34	Q	V				
14+50	2.6656	6.56	Q	V				
14+55	2.7124	6.79	Q	V				
15+ 0	2.7610	7.06	Q	V				
15+ 5	2.8115	7.33	Q	V				
15+10	2.8643	7.67	Q	V				
15+15	2.9196	8.03	Q	V				
15+20	2.9779	8.46	Q	V				
15+25	3.0384	8.79	Q	V				
15+30	3.0980	8.66	Q	V				
15+35	3.1585	8.78	Q	V				
15+40	3.2243	9.55	Q	V				
15+45	3.2979	10.69	Q	V				
15+50	3.3859	12.78	Q	V				
15+55	3.4922	15.43	Q	V				
16+ 0	3.6306	20.10	Q	V				
16+ 5	3.8484	31.62	Q	V				
16+10	4.2277	55.08	Q	V				
16+15	4.5221	42.74	Q	V				
16+20	4.6595	19.95	Q	V				
16+25	4.7444	12.34	Q	V				
16+30	4.8111	9.68	Q	V				
16+35	4.8720	8.84	Q	V				
16+40	4.9272	8.02	Q	V				
16+45	4.9777	7.34	Q	V				
16+50	5.0245	6.79	Q	V				
16+55	5.0681	6.34	Q	V				
17+ 0	5.1092	5.96	Q	V				
17+ 5	5.1481	5.65	Q	V				
17+10	5.1853	5.40	Q	V				
17+15	5.2210	5.18	Q	V				
17+20	5.2553	4.97	Q	V				
17+25	5.2882	4.78	Q	V				
17+30	5.3200	4.61	Q	V				
17+35	5.3506	4.45	Q	V				
17+40	5.3803	4.31	Q	V				
17+45	5.4091	4.18	Q	V				
17+50	5.4370	4.06	Q	V				
17+55	5.4642	3.94	Q	V				
18+ 0	5.4906	3.84	Q	V				
18+ 5	5.5158	3.66	Q	V				
18+10	5.5374	3.14	Q	V				
18+15	5.5563	2.74	Q	V				
18+20	5.5742	2.60	Q	V				
18+25	5.5916	2.52	Q	V				
18+30	5.6086	2.47	Q	V				

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18+35	5.6252	2.41	Q			V
18+40	5.6415	2.36	Q			V
18+45	5.6574	2.31	Q			V
18+50	5.6729	2.26	Q			V
18+55	5.6882	2.22	Q			V
19+ 0	5.7032	2.18	Q			V
19+ 5	5.7179	2.14	Q			V
19+10	5.7324	2.10	Q			V
19+15	5.7466	2.06	Q			V
19+20	5.7606	2.03	Q			V
19+25	5.7743	1.99	Q			V
19+30	5.7878	1.96	Q			V
19+35	5.8011	1.93	Q			V
19+40	5.8142	1.90	Q			V
19+45	5.8271	1.87	Q			V
19+50	5.8398	1.85	Q			V
19+55	5.8523	1.82	Q			V
20+ 0	5.8647	1.79	Q			V
20+ 5	5.8769	1.77	Q			V
20+10	5.8889	1.75	Q			V
20+15	5.9007	1.72	Q			V
20+20	5.9124	1.70	Q			V
20+25	5.9240	1.68	Q			V
20+30	5.9354	1.66	Q			V
20+35	5.9467	1.64	Q			V
20+40	5.9579	1.62	Q			V
20+45	5.9689	1.60	Q			V
20+50	5.9798	1.58	Q			V
20+55	5.9905	1.56	Q			V
21+ 0	6.0012	1.55	Q			V
21+ 5	6.0117	1.53	Q			V
21+10	6.0221	1.51	Q			V
21+15	6.0325	1.50	Q			V
21+20	6.0427	1.48	Q			V
21+25	6.0528	1.47	Q			V
21+30	6.0628	1.45	Q			V
21+35	6.0727	1.44	Q			V
21+40	6.0825	1.42	Q			V
21+45	6.0922	1.41	Q			V
21+50	6.1018	1.40	Q			V
21+55	6.1113	1.38	Q			V
22+ 0	6.1208	1.37	Q			V
22+ 5	6.1301	1.36	Q			V
22+10	6.1394	1.35	Q			V
22+15	6.1486	1.34	Q			V
22+20	6.1577	1.32	Q			V
22+25	6.1668	1.31	Q			V
22+30	6.1757	1.30	Q			V
22+35	6.1846	1.29	Q			V
22+40	6.1934	1.28	Q			V
22+45	6.2022	1.27	Q			V
22+50	6.2108	1.26	Q			V
22+55	6.2194	1.25	Q			V
23+ 0	6.2280	1.24	Q			V
23+ 5	6.2365	1.23	Q			V
23+10	6.2449	1.22	Q			V
23+15	6.2532	1.21	Q			V
23+20	6.2615	1.20	Q			V
23+25	6.2697	1.19	Q			V
23+30	6.2779	1.18	Q			V
23+35	6.2860	1.18	Q			V
23+40	6.2940	1.17	Q			V
23+45	6.3020	1.16	Q			V
23+50	6.3099	1.15	Q			V
23+55	6.3178	1.14	Q			V
24+ 0	6.3256	1.14	Q			V

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24+ 5
24+10
24+15
24+20

6.3327
6.3361
6.3368
6.3370

1.02 Q
0.50 Q
0.11 Q
0.02 Q

V|
V|
V|
V|

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Unit Hydrograph Analysis

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Study date 11/14/11 File Name 100288EXB25UH.out

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Orange County Unit Hydrograph Hydrology Method
Manual Date(s) - October 1986, November 1996

Program License Serial Number 4014

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
EXISTING CONDITION
AREA B

Storm Event Year = 25

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used
+++++-----

***** Area-averaged max loss rate, Fm *****

SCS curve No. (AMCII)	Area (Ac.)	Area Fraction	Soil Group	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
71.3	6.6	1.00	D	0.200	0.100	0.020

Area-averaged adjusted loss rate Fm (In/Hr) = 0.020

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
0.66	0.100	71.3	71.3	4.03	0.392
5.94	0.900	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.892

Area-averaged low loss fraction, Yb = 0.108
+++++-----

User entry of time of concentration = 0.133 (hours)

Watershed area = 6.60(Ac.)

Catchment Lag time = 0.106 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 78.4388

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.020(In/Hr)

Average low loss rate fraction (Yb) = 0.108 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.400(In)

Computed peak 30-minute rainfall = 0.870(In)

Specified peak 1-hour rainfall = 1.150(In)

Computed peak 3-hour rainfall = 1.940(In)

Specified peak 6-hour rainfall = 2.710(In)

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 Specified peak 24-hour rainfall = 4.490(In)

Rainfall depth area reduction factors:
 Using a total area of 6.60(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000	Adjusted rainfall = 0.400(In)
30-minute factor = 1.000	Adjusted rainfall = 0.870(In)
1-hour factor = 1.000	Adjusted rainfall = 1.150(In)
3-hour factor = 1.000	Adjusted rainfall = 1.940(In)
6-hour factor = 1.000	Adjusted rainfall = 2.710(In)
24-hour factor = 1.000	Adjusted rainfall = 4.490(In)

U n i t H y d r o g r a p h

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 79.82 (CFS))	
1	10.894	8.696
2	62.244	40.986
3	93.424	24.888
4	98.738	4.242
5	100.000	1.007

Total soil rain loss = 0.31(In)

Total effective rainfall = 4.18(In)

Peak flow rate in flood hydrograph = 21.01(CFS)

24 - H O U R S T O R M R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0003	0.04	Q				
0+10	0.0020	0.25	Q				
0+15	0.0046	0.38	Q				
0+20	0.0074	0.40	Q				
0+25	0.0102	0.41	Q				
0+30	0.0130	0.41	Q				
0+35	0.0159	0.41	Q				
0+40	0.0187	0.41	Q				
0+45	0.0216	0.41	Q				
0+50	0.0244	0.42	Q				
0+55	0.0273	0.42	Q				
1+ 0	0.0302	0.42	Q				
1+ 5	0.0331	0.42	Q				
1+10	0.0360	0.42	Q				
1+15	0.0389	0.42	Q				
1+20	0.0418	0.42	Q				
1+25	0.0447	0.43	Q				
1+30	0.0477	0.43	Q				
1+35	0.0506	0.43	Q				
1+40	0.0536	0.43	Q				
1+45	0.0565	0.43	Q				
1+50	0.0595	0.43	QV				
1+55	0.0625	0.43	QV				
2+ 0	0.0655	0.44	QV				

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2+ 5	0.0685	0.44	QV
2+10	0.0716	0.44	QV
2+15	0.0746	0.44	QV
2+20	0.0777	0.44	QV
2+25	0.0807	0.44	QV
2+30	0.0838	0.45	QV
2+35	0.0869	0.45	QV
2+40	0.0900	0.45	QV
2+45	0.0931	0.45	QV
2+50	0.0962	0.45	QV
2+55	0.0994	0.46	QV
3+ 0	0.1025	0.46	QV
3+ 5	0.1057	0.46	QV
3+10	0.1088	0.46	QV
3+15	0.1120	0.46	QV
3+20	0.1152	0.46	Q V
3+25	0.1185	0.47	Q V
3+30	0.1217	0.47	Q V
3+35	0.1249	0.47	Q V
3+40	0.1282	0.47	Q V
3+45	0.1314	0.47	Q V
3+50	0.1347	0.48	Q V
3+55	0.1380	0.48	Q V
4+ 0	0.1413	0.48	Q V
4+ 5	0.1447	0.48	Q V
4+10	0.1480	0.49	Q V
4+15	0.1514	0.49	Q V
4+20	0.1547	0.49	Q V
4+25	0.1581	0.49	Q V
4+30	0.1615	0.49	Q V
4+35	0.1649	0.50	Q V
4+40	0.1684	0.50	Q V
4+45	0.1718	0.50	Q V
4+50	0.1753	0.50	Q V
4+55	0.1787	0.51	Q V
5+ 0	0.1822	0.51	Q V
5+ 5	0.1858	0.51	Q V
5+10	0.1893	0.51	Q V
5+15	0.1928	0.51	Q V
5+20	0.1964	0.52	Q V
5+25	0.2000	0.52	Q V
5+30	0.2036	0.52	Q V
5+35	0.2072	0.53	Q V
5+40	0.2108	0.53	Q V
5+45	0.2145	0.53	Q V
5+50	0.2182	0.53	Q V
5+55	0.2219	0.54	Q V
6+ 0	0.2256	0.54	Q V
6+ 5	0.2293	0.54	Q V
6+10	0.2330	0.54	Q V
6+15	0.2368	0.55	Q V
6+20	0.2406	0.55	Q V
6+25	0.2444	0.55	Q V
6+30	0.2482	0.56	Q V
6+35	0.2521	0.56	Q V
6+40	0.2560	0.56	Q V
6+45	0.2599	0.57	Q V
6+50	0.2638	0.57	Q V
6+55	0.2677	0.57	Q V
7+ 0	0.2717	0.58	Q V
7+ 5	0.2757	0.58	Q V
7+10	0.2797	0.58	Q V
7+15	0.2837	0.59	Q V
7+20	0.2878	0.59	Q V
7+25	0.2919	0.59	Q V
7+30	0.2960	0.60	Q V

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7+35	0.3001	0.60	Q	V
7+40	0.3043	0.60	Q	V
7+45	0.3084	0.61	Q	V
7+50	0.3127	0.61	Q	V
7+55	0.3169	0.62	Q	V
8+ 0	0.3212	0.62	Q	V
8+ 5	0.3254	0.62	Q	V
8+10	0.3298	0.63	Q	V
8+15	0.3341	0.63	Q	V
8+20	0.3385	0.64	Q	V
8+25	0.3429	0.64	Q	V
8+30	0.3473	0.64	Q	V
8+35	0.3518	0.65	Q	V
8+40	0.3563	0.65	Q	V
8+45	0.3609	0.66	Q	V
8+50	0.3654	0.66	Q	V
8+55	0.3700	0.67	Q	V
9+ 0	0.3747	0.67	Q	V
9+ 5	0.3793	0.68	Q	V
9+10	0.3840	0.68	Q	V
9+15	0.3888	0.69	Q	V
9+20	0.3935	0.69	Q	V
9+25	0.3983	0.70	Q	V
9+30	0.4032	0.70	Q	V
9+35	0.4081	0.71	Q	V
9+40	0.4130	0.72	Q	V
9+45	0.4180	0.72	Q	V
9+50	0.4230	0.73	Q	V
9+55	0.4281	0.73	Q	V
10+ 0	0.4331	0.74	Q	V
10+ 5	0.4383	0.75	Q	V
10+10	0.4435	0.75	Q	V
10+15	0.4487	0.76	Q	V
10+20	0.4540	0.77	Q	V
10+25	0.4593	0.77	Q	V
10+30	0.4647	0.78	Q	V
10+35	0.4701	0.79	Q	V
10+40	0.4756	0.80	Q	V
10+45	0.4811	0.80	Q	V
10+50	0.4867	0.81	Q	V
10+55	0.4924	0.82	Q	V
11+ 0	0.4981	0.83	Q	V
11+ 5	0.5038	0.84	Q	V
11+10	0.5097	0.85	Q	V
11+15	0.5155	0.85	Q	V
11+20	0.5215	0.86	Q	V
11+25	0.5275	0.87	Q	V
11+30	0.5336	0.88	Q	V
11+35	0.5397	0.89	Q	V
11+40	0.5460	0.90	Q	V
11+45	0.5523	0.91	Q	V
11+50	0.5586	0.93	Q	V
11+55	0.5651	0.94	Q	V
12+ 0	0.5716	0.95	Q	V
12+ 5	0.5785	1.00	Q	V
12+10	0.5867	1.19	Q	V
12+15	0.5957	1.31	Q	V
12+20	0.6049	1.34	Q	V
12+25	0.6143	1.36	Q	V
12+30	0.6238	1.38	Q	V
12+35	0.6334	1.40	Q	V
12+40	0.6432	1.42	Q	V
12+45	0.6530	1.44	Q	V
12+50	0.6631	1.46	Q	V
12+55	0.6732	1.48	Q	V
13+ 0	0.6836	1.50	Q	V

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13+ 5	0.6940	1.52	Q	V
13+10	0.7047	1.55	Q	V
13+15	0.7155	1.57	Q	V
13+20	0.7265	1.60	Q	V
13+25	0.7376	1.62	Q	V
13+30	0.7490	1.65	Q	V
13+35	0.7606	1.68	Q	V
13+40	0.7723	1.71	Q	V
13+45	0.7843	1.74	Q	V
13+50	0.7966	1.78	Q	V
13+55	0.8090	1.81	Q	V
14+ 0	0.8218	1.85	Q	V
14+ 5	0.8348	1.89	Q	V
14+10	0.8480	1.92	Q	V
14+15	0.8615	1.95	Q	V
14+20	0.8753	2.00	Q	V
14+25	0.8894	2.05	Q	V
14+30	0.9040	2.11	Q	V
14+35	0.9189	2.17	Q	V
14+40	0.9343	2.24	Q	V
14+45	0.9502	2.31	Q	V
14+50	0.9667	2.39	Q	V
14+55	0.9837	2.47	Q	V
15+ 0	1.0014	2.57	Q	V
15+ 5	1.0198	2.67	Q	V
15+10	1.0391	2.80	Q	V
15+15	1.0593	2.93	Q	V
15+20	1.0805	3.09	Q	V
15+25	1.1026	3.20	Q	V
15+30	1.1242	3.13	Q	V
15+35	1.1462	3.20	Q	V
15+40	1.1703	3.51	Q	V
15+45	1.1974	3.93	Q	V
15+50	1.2300	4.74	Q	V
15+55	1.2694	5.72	Q	V
16+ 0	1.3212	7.52	Q	V
16+ 5	1.4042	12.06	Q	V
16+10	1.5489	21.01	Q	V
16+15	1.6488	14.51	Q	V
16+20	1.6936	6.50	Q	V
16+25	1.7227	4.23	Q	V
16+30	1.7466	3.47	Q	V
16+35	1.7685	3.17	Q	V
16+40	1.7883	2.88	Q	V
16+45	1.8065	2.64	Q	V
16+50	1.8233	2.44	Q	V
16+55	1.8390	2.28	Q	V
17+ 0	1.8538	2.15	Q	V
17+ 5	1.8678	2.04	Q	V
17+10	1.8813	1.95	Q	V
17+15	1.8942	1.87	Q	V
17+20	1.9065	1.80	Q	V
17+25	1.9185	1.73	Q	V
17+30	1.9299	1.67	Q	V
17+35	1.9410	1.61	Q	V
17+40	1.9518	1.56	Q	V
17+45	1.9622	1.51	Q	V
17+50	1.9723	1.47	Q	V
17+55	1.9821	1.43	Q	V
18+ 0	1.9917	1.39	Q	V
18+ 5	2.0007	1.32	Q	V
18+10	2.0084	1.11	Q	V
18+15	2.0151	0.98	Q	V
18+20	2.0216	0.94	Q	V
18+25	2.0279	0.91	Q	V
18+30	2.0340	0.89	Q	V

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18+35	2.0400	0.87	Q					V
18+40	2.0458	0.85	Q					V
18+45	2.0516	0.83	Q					V
18+50	2.0572	0.82	Q					V
18+55	2.0627	0.80	Q					V
19+ 0	2.0681	0.78	Q					V
19+ 5	2.0734	0.77	Q					V
19+10	2.0786	0.76	Q					V
19+15	2.0837	0.74	Q					V
19+20	2.0888	0.73	Q					V
19+25	2.0937	0.72	Q					V
19+30	2.0986	0.71	Q					V
19+35	2.1034	0.70	Q					V
19+40	2.1081	0.69	Q					V
19+45	2.1128	0.68	Q					V
19+50	2.1174	0.67	Q					V
19+55	2.1219	0.66	Q					V
20+ 0	2.1263	0.65	Q					V
20+ 5	2.1307	0.64	Q					V
20+10	2.1351	0.63	Q					V
20+15	2.1393	0.62	Q					V
20+20	2.1436	0.61	Q					V
20+25	2.1477	0.61	Q					V
20+30	2.1519	0.60	Q					V
20+35	2.1559	0.59	Q					V
20+40	2.1600	0.58	Q					V
20+45	2.1639	0.58	Q					V
20+50	2.1679	0.57	Q					V
20+55	2.1717	0.56	Q					V
21+ 0	2.1756	0.56	Q					V
21+ 5	2.1794	0.55	Q					V
21+10	2.1832	0.55	Q					V
21+15	2.1869	0.54	Q					V
21+20	2.1906	0.53	Q					V
21+25	2.1942	0.53	Q					V
21+30	2.1978	0.52	Q					V
21+35	2.2014	0.52	Q					V
21+40	2.2049	0.51	Q					V
21+45	2.2084	0.51	Q					V
21+50	2.2119	0.50	Q					V
21+55	2.2153	0.50	Q					V
22+ 0	2.2188	0.49	Q					V
22+ 5	2.2221	0.49	Q					V
22+10	2.2255	0.49	Q					V
22+15	2.2288	0.48	Q					V
22+20	2.2321	0.48	Q					V
22+25	2.2354	0.47	Q					V
22+30	2.2386	0.47	Q					V
22+35	2.2418	0.47	Q					V
22+40	2.2450	0.46	Q					V
22+45	2.2481	0.46	Q					V
22+50	2.2513	0.45	Q					V
22+55	2.2544	0.45	Q					V
23+ 0	2.2575	0.45	Q					V
23+ 5	2.2605	0.44	Q					V
23+10	2.2635	0.44	Q					V
23+15	2.2666	0.44	Q					V
23+20	2.2695	0.43	Q					V
23+25	2.2725	0.43	Q					V
23+30	2.2755	0.43	Q					V
23+35	2.2784	0.42	Q					V
23+40	2.2813	0.42	Q					V
23+45	2.2842	0.42	Q					V
23+50	2.2870	0.42	Q					V
23+55	2.2899	0.41	Q					V
24+ 0	2.2927	0.41	Q					V

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24+ 5

2.2952

0.36 Q | | | | V

24+10

2.2963

0.15 Q | | | | V

24+15

2.2965

0.03 Q | | | | V

24+20

2.2965

0.01 Q | | | | V

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Unit Hydrograph Analysis

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Study date 11/14/11 File Name 100288EXA100UH.out

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Orange County Unit Hydrograph Hydrology Method
Manual Date(s) - October 1986, November 1996

Program License Serial Number 4014

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
EXISTING CONDITION
AREA A

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used
+++++
***** Area-averaged max loss rate, Fm *****

SCS curve No. (AMCII)	Area (Ac.)	Area Fraction	Soil Group	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
73.8	18.2	1.00	D	0.200	0.100	0.020

Area-averaged adjusted loss rate Fm (In/Hr) = 0.020

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
1.82	0.100	73.8	90.0	1.11	0.798
16.36	0.900	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.942

Area-averaged low loss fraction, Yb = 0.058

+++++
User entry of time of concentration = 0.143 (hours)

Watershed area = 18.18(Ac.)

Catchment Lag time = 0.114 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 72.8438

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.020(In/Hr)

Average low loss rate fraction (Yb) = 0.058 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.520(In)

Computed peak 30-minute rainfall = 1.090(In)

Specified peak 1-hour rainfall = 1.450(In)

Computed peak 3-hour rainfall = 2.430(In)

Specified peak 6-hour rainfall = 3.360(In)

100288EXA100UH.out
Specified peak 24-hour rainfall = 5.630(In)

Rainfall depth area reduction factors:
Using a total area of 18.18(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999	Adjusted rainfall = 0.520(In)
30-minute factor = 0.999	Adjusted rainfall = 1.089(In)
1-hour factor = 0.999	Adjusted rainfall = 1.449(In)
3-hour factor = 1.000	Adjusted rainfall = 2.430(In)
6-hour factor = 1.000	Adjusted rainfall = 3.360(In)
24-hour factor = 1.000	Adjusted rainfall = 5.630(In)

Unit Hydrograph

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 219.86 (CFS))		
1	9.468	20.817
2	56.532	103.477
3	90.930	75.628
4	98.256	16.108
5	100.000	3.835

Total soil rain loss = 0.25(In)
Total effective rainfall = 5.38(In)
Peak flow rate in flood hydrograph = 70.94(CFS)

24 - H O U R S T O R M

Run off	Hydrograph
Hydrograph in 5 Minute intervals ((CFS))	

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	20.0	40.0	60.0	80.0
0+ 5	0.0010	0.14	Q				
0+10	0.0069	0.85	Q				
0+15	0.0163	1.37	Q				
0+20	0.0266	1.49	Q				
0+25	0.0371	1.52	Q				
0+30	0.0476	1.53	Q				
0+35	0.0581	1.53	Q				
0+40	0.0687	1.54	Q				
0+45	0.0793	1.54	Q				
0+50	0.0900	1.55	Q				
0+55	0.1006	1.55	Q				
1+ 0	0.1114	1.56	Q				
1+ 5	0.1221	1.56	Q				
1+10	0.1329	1.57	Q				
1+15	0.1438	1.57	Q				
1+20	0.1546	1.58	Q				
1+25	0.1656	1.58	Q				
1+30	0.1765	1.59	Q				
1+35	0.1875	1.60	Q				
1+40	0.1985	1.60	Q				
1+45	0.2096	1.61	QV				
1+50	0.2207	1.61	QV				
1+55	0.2319	1.62	QV				
2+ 0	0.2430	1.63	QV				

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2+ 5	0.2543	1.63 QV
2+10	0.2656	1.64 QV
2+15	0.2769	1.64 QV
2+20	0.2882	1.65 QV
2+25	0.2996	1.66 QV
2+30	0.3111	1.66 QV
2+35	0.3226	1.67 QV
2+40	0.3341	1.68 QV
2+45	0.3457	1.68 QV
2+50	0.3573	1.69 QV
2+55	0.3690	1.69 QV
3+ 0	0.3807	1.70 QV
3+ 5	0.3925	1.71 QV
3+10	0.4043	1.72 QV
3+15	0.4161	1.72 Q V
3+20	0.4281	1.73 Q V
3+25	0.4400	1.74 Q V
3+30	0.4520	1.74 Q V
3+35	0.4641	1.75 Q V
3+40	0.4762	1.76 Q V
3+45	0.4883	1.76 Q V
3+50	0.5005	1.77 Q V
3+55	0.5128	1.78 Q V
4+ 0	0.5251	1.79 Q V
4+ 5	0.5375	1.80 Q V
4+10	0.5499	1.80 Q V
4+15	0.5624	1.81 Q V
4+20	0.5749	1.82 Q V
4+25	0.5875	1.83 Q V
4+30	0.6001	1.84 Q V
4+35	0.6128	1.84 Q V
4+40	0.6256	1.85 Q V
4+45	0.6384	1.86 Q V
4+50	0.6513	1.87 Q V
4+55	0.6642	1.88 Q V
5+ 0	0.6772	1.89 Q V
5+ 5	0.6902	1.90 Q V
5+10	0.7034	1.90 Q V
5+15	0.7165	1.91 Q V
5+20	0.7298	1.92 Q V
5+25	0.7431	1.93 Q V
5+30	0.7564	1.94 Q V
5+35	0.7699	1.95 Q V
5+40	0.7834	1.96 Q V
5+45	0.7970	1.97 Q V
5+50	0.8106	1.98 Q V
5+55	0.8243	1.99 Q V
6+ 0	0.8381	2.00 Q V
6+ 5	0.8519	2.01 Q V
6+10	0.8658	2.02 Q V
6+15	0.8798	2.03 Q V
6+20	0.8939	2.04 Q V
6+25	0.9081	2.05 Q V
6+30	0.9223	2.06 Q V
6+35	0.9366	2.08 Q V
6+40	0.9509	2.09 Q V
6+45	0.9654	2.10 Q V
6+50	0.9799	2.11 Q V
6+55	0.9946	2.12 Q V
7+ 0	1.0093	2.13 Q V
7+ 5	1.0240	2.15 Q V
7+10	1.0389	2.16 Q V
7+15	1.0539	2.17 Q V
7+20	1.0689	2.18 Q V
7+25	1.0841	2.20 Q V
7+30	1.0993	2.21 Q V

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7+35	1.1146	2.22	Q	V
7+40	1.1300	2.24	Q	V
7+45	1.1455	2.25	Q	V
7+50	1.1611	2.27	Q	V
7+55	1.1768	2.28	Q	V
8+ 0	1.1926	2.29	Q	V
8+ 5	1.2085	2.31	Q	V
8+10	1.2245	2.32	Q	V
8+15	1.2407	2.34	Q	V
8+20	1.2569	2.36	Q	V
8+25	1.2732	2.37	Q	V
8+30	1.2897	2.39	Q	V
8+35	1.3062	2.40	Q	V
8+40	1.3229	2.42	Q	V
8+45	1.3397	2.44	Q	V
8+50	1.3566	2.45	Q	V
8+55	1.3736	2.47	Q	V
9+ 0	1.3907	2.49	Q	V
9+ 5	1.4080	2.51	Q	V
9+10	1.4254	2.53	Q	V
9+15	1.4430	2.55	Q	V
9+20	1.4606	2.57	Q	V
9+25	1.4784	2.58	Q	V
9+30	1.4964	2.61	Q	V
9+35	1.5145	2.63	Q	V
9+40	1.5327	2.65	Q	V
9+45	1.5511	2.67	Q	V
9+50	1.5696	2.69	Q	V
9+55	1.5883	2.71	Q	V
10+ 0	1.6071	2.74	Q	V
10+ 5	1.6261	2.76	Q	V
10+10	1.6453	2.78	Q	V
10+15	1.6646	2.81	Q	V
10+20	1.6841	2.83	Q	V
10+25	1.7038	2.86	Q	V
10+30	1.7237	2.88	Q	V
10+35	1.7437	2.91	Q	V
10+40	1.7640	2.94	Q	V
10+45	1.7844	2.97	Q	V
10+50	1.8050	3.00	Q	V
10+55	1.8258	3.02	Q	V
11+ 0	1.8469	3.06	Q	V
11+ 5	1.8681	3.09	Q	V
11+10	1.8896	3.12	Q	V
11+15	1.9113	3.15	Q	V
11+20	1.9333	3.19	Q	V
11+25	1.9554	3.22	Q	V
11+30	1.9779	3.26	Q	V
11+35	2.0006	3.29	Q	V
11+40	2.0235	3.33	Q	V
11+45	2.0467	3.37	Q	V
11+50	2.0702	3.41	Q	V
11+55	2.0940	3.45	Q	V
12+ 0	2.1180	3.50	Q	V
12+ 5	2.1430	3.63	Q	V
12+10	2.1713	4.11	Q	V
12+15	2.2021	4.47	Q	V
12+20	2.2337	4.59	Q	V
12+25	2.2658	4.66	Q	V
12+30	2.2983	4.72	Q	V
12+35	2.3312	4.77	Q	V
12+40	2.3645	4.84	Q	V
12+45	2.3982	4.90	Q	V
12+50	2.4324	4.96	Q	V
12+55	2.4670	5.03	Q	V
13+ 0	2.5021	5.10	Q	V

100288EXA100UH.out

13+ 5	2.5377	5.17	Q	V				
13+10	2.5738	5.25	Q	V				
13+15	2.6105	5.32	Q	V				
13+20	2.6477	5.41	Q	V				
13+25	2.6855	5.49	Q	V				
13+30	2.7240	5.58	Q	V				
13+35	2.7631	5.67	Q	V				
13+40	2.8029	5.78	Q	V				
13+45	2.8433	5.88	Q	V				
13+50	2.8846	6.00	Q	V				
13+55	2.9268	6.12	Q	V				
14+ 0	2.9698	6.25	Q	V				
14+ 5	3.0138	6.39	Q	V				
14+10	3.0590	6.56	Q	V				
14+15	3.1053	6.73	Q	V				
14+20	3.1529	6.90	Q	V				
14+25	3.2016	7.08	Q	V				
14+30	3.2517	7.28	Q	V				
14+35	3.3032	7.48	Q	V				
14+40	3.3564	7.71	Q	V				
14+45	3.4111	7.95	Q	V				
14+50	3.4677	8.22	Q	V				
14+55	3.5263	8.51	Q	V				
15+ 0	3.5873	8.85	Q	V				
15+ 5	3.6506	9.20	Q	V				
15+10	3.7168	9.62	Q	V				
15+15	3.7862	10.06	Q	V				
15+20	3.8593	10.61	Q	V				
15+25	3.9354	11.06	Q	V				
15+30	4.0117	11.08	Q	V				
15+35	4.0901	11.38	Q	V				
15+40	4.1755	12.40	Q	V				
15+45	4.2701	13.73	Q	V				
15+50	4.3789	15.81	Q	V				
15+55	4.5079	18.73	Q	V				
16+ 0	4.6768	24.52	Q	V				
16+ 5	4.9492	39.55	Q	V				
16+10	5.4377	70.94	Q	V				
16+15	5.8120	54.35	Q	V				
16+20	5.9845	25.04	Q	V				
16+25	6.0930	15.75	Q	V				
16+30	6.1775	12.28	Q	V				
16+35	6.2540	11.11	Q	V				
16+40	6.3232	10.05	Q	V				
16+45	6.3866	9.19	Q	V				
16+50	6.4451	8.50	Q	V				
16+55	6.4998	7.94	Q	V				
17+ 0	6.5512	7.47	Q	V				
17+ 5	6.5998	7.06	Q	V				
17+10	6.6459	6.70	Q	V				
17+15	6.6899	6.38	Q	V				
17+20	6.7319	6.11	Q	V				
17+25	6.7724	5.87	Q	V				
17+30	6.8114	5.67	Q	V				
17+35	6.8492	5.48	Q	V				
17+40	6.8858	5.31	Q	V				
17+45	6.9213	5.16	Q	V				
17+50	6.9559	5.02	Q	V				
17+55	6.9895	4.89	Q	V				
18+ 0	7.0224	4.77	Q	V				
18+ 5	7.0538	4.57	Q	V				
18+10	7.0816	4.03	Q	V				
18+15	7.1065	3.62	Q	V				
18+20	7.1304	3.46	Q	V				
18+25	7.1535	3.37	Q	V				
18+30	7.1762	3.29	Q	V				

100288EXA100UH.out

18+35	7.1983	3.22	Q			V
18+40	7.2200	3.15	Q			V
18+45	7.2412	3.08	Q			V
18+50	7.2620	3.02	Q			V
18+55	7.2825	2.96	Q			V
19+ 0	7.3025	2.91	Q			V
19+ 5	7.3221	2.85	Q			V
19+10	7.3414	2.80	Q			V
19+15	7.3604	2.76	Q			V
19+20	7.3791	2.71	Q			V
19+25	7.3974	2.67	Q			V
19+30	7.4155	2.62	Q			V
19+35	7.4333	2.58	Q			V
19+40	7.4508	2.54	Q			V
19+45	7.4681	2.51	Q			V
19+50	7.4851	2.47	Q			V
19+55	7.5018	2.43	Q			V
20+ 0	7.5184	2.40	Q			V
20+ 5	7.5347	2.37	Q			V
20+10	7.5508	2.34	Q			V
20+15	7.5667	2.31	Q			V
20+20	7.5824	2.28	Q			V
20+25	7.5979	2.25	Q			V
20+30	7.6132	2.22	Q			V
20+35	7.6283	2.20	Q			V
20+40	7.6433	2.17	Q			V
20+45	7.6580	2.15	Q			V
20+50	7.6726	2.12	Q			V
20+55	7.6871	2.10	Q			V
21+ 0	7.7014	2.07	Q			V
21+ 5	7.7155	2.05	Q			V
21+10	7.7295	2.03	Q			V
21+15	7.7433	2.01	Q			V
21+20	7.7570	1.99	Q			V
21+25	7.7706	1.97	Q			V
21+30	7.7840	1.95	Q			V
21+35	7.7973	1.93	Q			V
21+40	7.8105	1.91	Q			V
21+45	7.8235	1.89	Q			V
21+50	7.8364	1.88	Q			V
21+55	7.8492	1.86	Q			V
22+ 0	7.8619	1.84	Q			V
22+ 5	7.8745	1.83	Q			V
22+10	7.8870	1.81	Q			V
22+15	7.8993	1.79	Q			V
22+20	7.9116	1.78	Q			V
22+25	7.9237	1.76	Q			V
22+30	7.9358	1.75	Q			V
22+35	7.9477	1.74	Q			V
22+40	7.9596	1.72	Q			V
22+45	7.9713	1.71	Q			V
22+50	7.9830	1.69	Q			V
22+55	7.9946	1.68	Q			V
23+ 0	8.0061	1.67	Q			V
23+ 5	8.0175	1.65	Q			V
23+10	8.0288	1.64	Q			V
23+15	8.0400	1.63	Q			V
23+20	8.0511	1.62	Q			V
23+25	8.0622	1.61	Q			V
23+30	8.0732	1.60	Q			V
23+35	8.0841	1.58	Q			V
23+40	8.0949	1.57	Q			V
23+45	8.1057	1.56	Q			V
23+50	8.1164	1.55	Q			V
23+55	8.1270	1.54	Q			V
24+ 0	8.1375	1.53	Q			V

100288EXA100UH.out

24+ 5	8.1470	1.38 Q				V
24+10	8.1515	0.66 Q				V
24+15	8.1525	0.14 Q				V
24+20	8.1527	0.03 Q				V

100288EXB100UH.out

Unit Hydrograph Analysis

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Study date 11/14/11 File Name 100288EXB100UH.out

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Orange County Unit Hydrograph Hydrology Method
Manual Date(s) - October 1986, November 1996

Program License Serial Number 4014

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
EXISTING CONDITION
AREA B

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

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***** Area-averaged max loss rate, Fm *****

SCS curve No. (AMCII)	Area (Ac.)	Area Fraction	Soil Group	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
71.3	6.6	1.00	D	0.200	0.100	0.020

Area-averaged adjusted loss rate Fm (In/Hr) = 0.020

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
0.66	0.100	71.3	88.0	1.36	0.759
5.94	0.900	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.938

Area-averaged low loss fraction, Yb = 0.062

+++++-----

User entry of time of concentration = 0.131 (hours)

Watershed area = 6.60(Ac.)

Catchment Lag time = 0.105 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 79.6381

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.020(In/Hr)

Average low loss rate fraction (Yb) = 0.062 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.520(In)

Computed peak 30-minute rainfall = 1.090(In)

Specified peak 1-hour rainfall = 1.450(In)

Computed peak 3-hour rainfall = 2.430(In)

Specified peak 6-hour rainfall = 3.360(In)

100288EXB100UH.out
Specified peak 24-hour rainfall = 5.630(In)

Rainfall depth area reduction factors:
Using a total area of 6.60(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000	Adjusted rainfall = 0.520(In)
30-minute factor = 1.000	Adjusted rainfall = 1.090(In)
1-hour factor = 1.000	Adjusted rainfall = 1.450(In)
3-hour factor = 1.000	Adjusted rainfall = 2.430(In)
6-hour factor = 1.000	Adjusted rainfall = 3.360(In)
24-hour factor = 1.000	Adjusted rainfall = 5.630(In)

Unit Hydrograph

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 79.82 (CFS))	
1	11.211	8.948
2	63.424	41.676
3	93.846	24.283
4	98.817	3.968
5	100.000	0.944

Total soil rain loss = 0.26(In)

Total effective rainfall = 5.37(In)

Peak flow rate in flood hydrograph = 27.23(CFS)

24 - H O U R S T O R M

Run off Hydrograph

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0004	0.06	Q				
0+10	0.0028	0.35	Q				
0+15	0.0063	0.51	Q				
0+20	0.0101	0.54	Q				
0+25	0.0139	0.55	Q				
0+30	0.0177	0.55	Q				
0+35	0.0215	0.55	Q				
0+40	0.0253	0.56	Q				
0+45	0.0291	0.56	Q				
0+50	0.0330	0.56	Q				
0+55	0.0369	0.56	Q				
1+ 0	0.0407	0.56	Q				
1+ 5	0.0446	0.57	Q				
1+10	0.0485	0.57	Q				
1+15	0.0525	0.57	Q				
1+20	0.0564	0.57	Q				
1+25	0.0603	0.57	Q				
1+30	0.0643	0.58	Q				
1+35	0.0683	0.58	Q				
1+40	0.0723	0.58	Q				
1+45	0.0763	0.58	QV				
1+50	0.0803	0.58	QV				
1+55	0.0843	0.59	QV				
2+ 0	0.0884	0.59	QV				

100288EXB100UH.out

2+ 5	0.0924	0.59	QV
2+10	0.0965	0.59	QV
2+15	0.1006	0.59	QV
2+20	0.1047	0.60	QV
2+25	0.1088	0.60	QV
2+30	0.1130	0.60	QV
2+35	0.1171	0.60	QV
2+40	0.1213	0.61	QV
2+45	0.1255	0.61	QV
2+50	0.1297	0.61	QV
2+55	0.1339	0.61	QV
3+ 0	0.1382	0.62	QV
3+ 5	0.1424	0.62	QV
3+10	0.1467	0.62	QV
3+15	0.1510	0.62	Q V
3+20	0.1553	0.63	Q V
3+25	0.1596	0.63	Q V
3+30	0.1640	0.63	Q V
3+35	0.1683	0.63	Q V
3+40	0.1727	0.64	Q V
3+45	0.1771	0.64	Q V
3+50	0.1815	0.64	Q V
3+55	0.1859	0.64	Q V
4+ 0	0.1904	0.65	Q V
4+ 5	0.1949	0.65	Q V
4+10	0.1994	0.65	Q V
4+15	0.2039	0.66	Q V
4+20	0.2084	0.66	Q V
4+25	0.2130	0.66	Q V
4+30	0.2175	0.66	Q V
4+35	0.2221	0.67	Q V
4+40	0.2267	0.67	Q V
4+45	0.2314	0.67	Q V
4+50	0.2360	0.68	Q V
4+55	0.2407	0.68	Q V
5+ 0	0.2454	0.68	Q V
5+ 5	0.2501	0.69	Q V
5+10	0.2549	0.69	Q V
5+15	0.2596	0.69	Q V
5+20	0.2644	0.70	Q V
5+25	0.2692	0.70	Q V
5+30	0.2741	0.70	Q V
5+35	0.2789	0.71	Q V
5+40	0.2838	0.71	Q V
5+45	0.2887	0.71	Q V
5+50	0.2937	0.72	Q V
5+55	0.2986	0.72	Q V
6+ 0	0.3036	0.72	Q V
6+ 5	0.3086	0.73	Q V
6+10	0.3137	0.73	Q V
6+15	0.3187	0.74	Q V
6+20	0.3238	0.74	Q V
6+25	0.3289	0.74	Q V
6+30	0.3341	0.75	Q V
6+35	0.3392	0.75	Q V
6+40	0.3444	0.76	Q V
6+45	0.3497	0.76	Q V
6+50	0.3549	0.76	Q V
6+55	0.3602	0.77	Q V
7+ 0	0.3655	0.77	Q V
7+ 5	0.3709	0.78	Q V
7+10	0.3763	0.78	Q V
7+15	0.3817	0.79	Q V
7+20	0.3871	0.79	Q V
7+25	0.3926	0.80	Q V
7+30	0.3981	0.80	Q V

100288EXB100UH.out

7+35	0.4037	0.80	Q	V		
7+40	0.4092	0.81	Q	V		
7+45	0.4148	0.81	Q	V		
7+50	0.4205	0.82	Q	V		
7+55	0.4262	0.82	Q	V		
8+ 0	0.4319	0.83	Q	V		
8+ 5	0.4376	0.84	Q	V		
8+10	0.4434	0.84	Q	V		
8+15	0.4493	0.85	Q	V		
8+20	0.4551	0.85	Q	V		
8+25	0.4610	0.86	Q	V		
8+30	0.4670	0.86	Q	V		
8+35	0.4730	0.87	Q	V		
8+40	0.4790	0.88	Q	V		
8+45	0.4851	0.88	Q	V		
8+50	0.4912	0.89	Q	V		
8+55	0.4974	0.89	Q	V		
9+ 0	0.5036	0.90	Q	V		
9+ 5	0.5098	0.91	Q	V		
9+10	0.5161	0.91	Q	V		
9+15	0.5225	0.92	Q	V		
9+20	0.5289	0.93	Q	V		
9+25	0.5353	0.94	Q	V		
9+30	0.5418	0.94	Q	V		
9+35	0.5483	0.95	Q	V		
9+40	0.5549	0.96	Q	V		
9+45	0.5616	0.97	Q	V		
9+50	0.5683	0.97	Q	V		
9+55	0.5751	0.98	Q	V		
10+ 0	0.5819	0.99	Q	V		
10+ 5	0.5888	1.00	Q	V		
10+10	0.5957	1.01	Q	V		
10+15	0.6027	1.02	Q	V		
10+20	0.6098	1.03	Q	V		
10+25	0.6169	1.03	Q	V		
10+30	0.6241	1.04	Q	V		
10+35	0.6313	1.05	Q	V		
10+40	0.6386	1.06	Q	V		
10+45	0.6460	1.07	Q	V		
10+50	0.6535	1.08	Q	V		
10+55	0.6611	1.09	Q	V		
11+ 0	0.6687	1.11	Q	V		
11+ 5	0.6764	1.12	Q	V		
11+10	0.6841	1.13	Q	V		
11+15	0.6920	1.14	Q	V		
11+20	0.6999	1.15	Q	V		
11+25	0.7080	1.17	Q	V		
11+30	0.7161	1.18	Q	V		
11+35	0.7243	1.19	Q	V		
11+40	0.7326	1.21	Q	V		
11+45	0.7410	1.22	Q	V		
11+50	0.7495	1.24	Q	V		
11+55	0.7581	1.25	Q	V		
12+ 0	0.7668	1.27	Q	V		
12+ 5	0.7759	1.32	Q	V		
12+10	0.7863	1.51	Q	V		
12+15	0.7975	1.63	Q	V		
12+20	0.8090	1.66	Q	V		
12+25	0.8206	1.69	Q	V		
12+30	0.8324	1.71	Q	V		
12+35	0.8443	1.73	Q	V		
12+40	0.8563	1.75	Q	V		
12+45	0.8685	1.77	Q	V		
12+50	0.8809	1.80	Q	V		
12+55	0.8935	1.82	Q	V		
13+ 0	0.9062	1.85	Q	V		

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13+ 5	0.9191	1.87	Q	V				
13+10	0.9322	1.90	Q	V				
13+15	0.9454	1.93	Q	V				
13+20	0.9589	1.96	Q	V				
13+25	0.9726	1.99	Q	V				
13+30	0.9866	2.02	Q	V				
13+35	1.0007	2.06	Q	V				
13+40	1.0152	2.10	Q	V				
13+45	1.0299	2.14	Q	V				
13+50	1.0449	2.18	Q	V				
13+55	1.0603	2.22	Q	V				
14+ 0	1.0759	2.28	Q Q	V V				
14+ 5	1.0919	2.32	Q Q	V V				
14+10	1.1084	2.39	Q Q	V				
14+15	1.1252	2.45	Q Q	V				
14+20	1.1426	2.51	Q Q	V				
14+25	1.1603	2.58	Q Q	V				
14+30	1.1785	2.65	Q Q	V				
14+35	1.1973	2.72	Q Q	V				
14+40	1.2166	2.81	Q Q	V				
14+45	1.2365	2.89	Q Q	V				
14+50	1.2572	3.00	Q Q	V				
14+55	1.2785	3.10	Q Q	V				
15+ 0	1.3007	3.23	Q Q	V				
15+ 5	1.3238	3.35	Q Q	V				
15+10	1.3480	3.51	Q Q	V				
15+15	1.3733	3.67	Q Q	V				
15+20	1.4000	3.88	Q Q	V				
15+25	1.4277	4.03	Q Q	V				
15+30	1.4554	4.02	Q Q	V				
15+35	1.4840	4.15	Q Q	V				
15+40	1.5154	4.55	Q Q	V				
15+45	1.5502	5.05	Q Q	V				
15+50	1.5904	5.84	Q Q	V				
15+55	1.6382	6.94	Q Q	V				
16+ 0	1.7016	9.20	Q	Q				
16+ 5	1.8063	15.19	Q	Q				
16+10	1.9938	27.23	Q	Q				
16+15	2.1194	18.24	Q	Q				
16+20	2.1750	8.09	Q	Q				
16+25	2.2121	5.38	Q	Q				
16+30	2.2424	4.39	Q	Q				
16+35	2.2698	3.98	Q	Q				
16+40	2.2946	3.60	Q	Q				
16+45	2.3173	3.30	Q	Q				
16+50	2.3384	3.06	Q	Q				
16+55	2.3580	2.86	Q	Q				
17+ 0	2.3765	2.69	Q	Q				
17+ 5	2.3941	2.54	Q	Q				
17+10	2.4107	2.41	Q	Q				
17+15	2.4265	2.30	Q	Q				
17+20	2.4417	2.20	Q	Q				
17+25	2.4563	2.12	Q	Q				
17+30	2.4704	2.04	Q	Q				
17+35	2.4840	1.97	Q	Q				
17+40	2.4972	1.91	Q	Q				
17+45	2.5100	1.86	Q	Q				
17+50	2.5224	1.81	Q	Q				
17+55	2.5346	1.76	Q	Q				
18+ 0	2.5464	1.72	Q	Q				
18+ 5	2.5577	1.64	Q	Q				
18+10	2.5676	1.43	Q	Q				
18+15	2.5765	1.29	Q	Q				
18+20	2.5851	1.25	Q	Q				
18+25	2.5934	1.21	Q	Q				
18+30	2.6016	1.19	Q	Q				

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18+35	2.6096	1.16	Q						
18+40	2.6174	1.14	Q						
18+45	2.6250	1.11	Q						
18+50	2.6325	1.09	Q						
18+55	2.6399	1.07	Q						
19+ 0	2.6471	1.05	Q						
19+ 5	2.6542	1.03	Q						V
19+10	2.6612	1.01	Q						V
19+15	2.6680	0.99	Q						V
19+20	2.6748	0.98	Q						V
19+25	2.6814	0.96	Q						V
19+30	2.6879	0.95	Q						V
19+35	2.6943	0.93	Q						V
19+40	2.7006	0.92	Q						V
19+45	2.7069	0.90	Q						V
19+50	2.7130	0.89	Q						V
19+55	2.7191	0.88	Q						V
20+ 0	2.7250	0.87	Q						V
20+ 5	2.7309	0.86	Q						V
20+10	2.7367	0.84	Q						V
20+15	2.7425	0.83	Q						V
20+20	2.7481	0.82	Q						V
20+25	2.7537	0.81	Q						V
20+30	2.7593	0.80	Q						V
20+35	2.7647	0.79	Q						V
20+40	2.7701	0.78	Q						V
20+45	2.7754	0.77	Q						V
20+50	2.7807	0.77	Q						V
20+55	2.7859	0.76	Q						V
21+ 0	2.7911	0.75	Q						V
21+ 5	2.7962	0.74	Q						V
21+10	2.8012	0.73	Q						V
21+15	2.8062	0.73	Q						V
21+20	2.8112	0.72	Q						V
21+25	2.8161	0.71	Q						V
21+30	2.8209	0.70	Q						V
21+35	2.8257	0.70	Q						V
21+40	2.8305	0.69	Q						V
21+45	2.8352	0.68	Q						V
21+50	2.8399	0.68	Q						V
21+55	2.8445	0.67	Q						V
22+ 0	2.8491	0.67	Q						V
22+ 5	2.8536	0.66	Q						V
22+10	2.8581	0.65	Q						V
22+15	2.8626	0.65	Q						V
22+20	2.8670	0.64	Q						V
22+25	2.8714	0.64	Q						V
22+30	2.8757	0.63	Q						V
22+35	2.8801	0.63	Q						V
22+40	2.8843	0.62	Q						V
22+45	2.8886	0.62	Q						V
22+50	2.8928	0.61	Q						V
22+55	2.8970	0.61	Q						V
23+ 0	2.9011	0.60	Q						V
23+ 5	2.9053	0.60	Q						V
23+10	2.9093	0.59	Q						V
23+15	2.9134	0.59	Q						V
23+20	2.9174	0.58	Q						V
23+25	2.9214	0.58	Q						V
23+30	2.9254	0.58	Q						V
23+35	2.9293	0.57	Q						V
23+40	2.9332	0.57	Q						V
23+45	2.9371	0.56	Q						V
23+50	2.9410	0.56	Q						V
23+55	2.9448	0.56	Q						V
24+ 0	2.9486	0.55	Q						V

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24+ 5
24+10
24+15
24+20

2.9520
2.9534
2.9536
2.9536

0.49 Q
0.20 Q
0.03 Q
0.01 Q

V|
V|
V|
V|

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Unit Hydrograph Analysis

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Study date 11/14/11 File Name 100288PRA25UH.out

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Orange County Unit Hydrograph Hydrology Method
Manual Date(s) - October 1986, November 1996

Program License Serial Number 4014

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
DEVELOPED CONDITION
AREA A

Storm Event Year = 25

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used

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***** Area-averaged max loss rate, Fm *****

SCS curve No. (AMCII)	Area (Ac.)	Area Fraction	Soil Group	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
73.8	17.7	1.00	D	0.200	0.183	0.037

Area-averaged adjusted loss rate Fm (In/Hr) = 0.037

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
3.25	0.183	73.8	73.8	3.55	0.434
14.49	0.817	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.854

Area-averaged low loss fraction, Yb = 0.146

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User entry of time of concentration = 0.195 (hours)

Watershed area = 17.74(Ac.)

Catchment Lag time = 0.156 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 53.3641

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.037(In/Hr)

Average low loss rate fraction (Yb) = 0.146 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.400(In)

Computed peak 30-minute rainfall = 0.870(In)

Specified peak 1-hour rainfall = 1.150(In)

Computed peak 3-hour rainfall = 1.940(In)

Specified peak 6-hour rainfall = 2.710(In)

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specified peak 24-hour rainfall = 4.490(In)

Rainfall depth area reduction factors:
Using a total area of 17.74(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999	Adjusted rainfall = 0.400(In)
30-minute factor = 0.999	Adjusted rainfall = 0.869(In)
1-hour factor = 0.999	Adjusted rainfall = 1.149(In)
3-hour factor = 1.000	Adjusted rainfall = 1.940(In)
6-hour factor = 1.000	Adjusted rainfall = 2.710(In)
24-hour factor = 1.000	Adjusted rainfall = 4.490(In)

Unit Hydrograph

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 214.54 (CFS))		

1	5.189	11.133
2	33.635	61.029
3	73.887	86.358
4	92.323	39.552
5	97.830	11.814
6	99.083	2.689
7	100.000	1.967

Total soil rain loss = 0.48(In)
Total effective rainfall = 4.01(In)
Peak flow rate in flood hydrograph = 46.80(CFS)

24 - H O U R S T O R M
R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	12.5	25.0	37.5	50.0
0+ 5	0.0004	0.05	Q				
0+10	0.0028	0.35	Q				
0+15	0.0081	0.77	Q				
0+20	0.0147	0.96	Q				
0+25	0.0218	1.02	Q				
0+30	0.0290	1.04	Q				
0+35	0.0362	1.05	Q				
0+40	0.0435	1.06	Q				
0+45	0.0508	1.06	Q				
0+50	0.0582	1.07	Q				
0+55	0.0655	1.07	Q				
1+ 0	0.0729	1.07	Q				
1+ 5	0.0803	1.08	Q				
1+10	0.0878	1.08	Q				
1+15	0.0952	1.08	Q				
1+20	0.1027	1.09	Q				
1+25	0.1102	1.09	Q				
1+30	0.1178	1.10	Q				
1+35	0.1254	1.10	Q				
1+40	0.1330	1.10	Q				
1+45	0.1406	1.11	Q				
1+50	0.1483	1.11	QV				

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1+55	0.1559	1.12	QV
2+ 0	0.1636	1.12	QV
2+ 5	0.1714	1.12	QV
2+10	0.1792	1.13	QV
2+15	0.1870	1.13	QV
2+20	0.1948	1.14	QV
2+25	0.2027	1.14	QV
2+30	0.2105	1.15	QV
2+35	0.2185	1.15	QV
2+40	0.2264	1.15	QV
2+45	0.2344	1.16	QV
2+50	0.2424	1.16	QV
2+55	0.2505	1.17	QV
3+ 0	0.2586	1.17	QV
3+ 5	0.2667	1.18	QV
3+10	0.2748	1.18	QV
3+15	0.2830	1.19	QV
3+20	0.2912	1.19	QV
3+25	0.2994	1.20	Q V
3+30	0.3077	1.20	Q V
3+35	0.3160	1.21	Q V
3+40	0.3244	1.21	Q V
3+45	0.3328	1.22	Q V
3+50	0.3412	1.22	Q V
3+55	0.3496	1.23	Q V
4+ 0	0.3581	1.23	Q V
4+ 5	0.3667	1.24	Q V
4+10	0.3752	1.24	Q V
4+15	0.3838	1.25	Q V
4+20	0.3925	1.26	QV
4+25	0.4012	1.26	QV
4+30	0.4099	1.27	QV
4+35	0.4187	1.27	QV
4+40	0.4275	1.28	QV
4+45	0.4363	1.28	QV
4+50	0.4452	1.29	Q V
4+55	0.4541	1.30	Q V
5+ 0	0.4631	1.30	Q V
5+ 5	0.4721	1.31	Q V
5+10	0.4811	1.31	Q V
5+15	0.4902	1.32	Q V
5+20	0.4994	1.33	Q V
5+25	0.5086	1.33	Q V
5+30	0.5178	1.34	Q V
5+35	0.5271	1.35	Q V
5+40	0.5364	1.35	Q V
5+45	0.5458	1.36	Q V
5+50	0.5552	1.37	Q V
5+55	0.5646	1.37	Q V
6+ 0	0.5742	1.38	Q V
6+ 5	0.5837	1.39	Q V
6+10	0.5933	1.40	Q V
6+15	0.6030	1.40	Q V
6+20	0.6127	1.41	Q V
6+25	0.6225	1.42	Q V
6+30	0.6323	1.43	Q V
6+35	0.6422	1.43	Q V
6+40	0.6521	1.44	Q V
6+45	0.6621	1.45	Q V
6+50	0.6721	1.46	Q V
6+55	0.6822	1.47	Q V
7+ 0	0.6924	1.47	Q V
7+ 5	0.7026	1.48	Q V
7+10	0.7129	1.49	Q V
7+15	0.7232	1.50	Q V
7+20	0.7336	1.51	Q V

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7+25	0.7441	1.52	Q	V		
7+30	0.7546	1.53	Q	V		
7+35	0.7652	1.54	Q	V		
7+40	0.7758	1.55	Q	V		
7+45	0.7866	1.56	Q	V		
7+50	0.7973	1.57	Q	V		
7+55	0.8082	1.58	Q	V		
8+ 0	0.8191	1.59	Q	V		
8+ 5	0.8301	1.60	Q	V		
8+10	0.8412	1.61	Q	V		
8+15	0.8523	1.62	Q	V		
8+20	0.8635	1.63	Q	V		
8+25	0.8748	1.64	Q	V		
8+30	0.8862	1.65	Q	V		
8+35	0.8977	1.66	Q	V		
8+40	0.9092	1.67	Q	V		
8+45	0.9208	1.69	Q	V		
8+50	0.9325	1.70	Q	V		
8+55	0.9443	1.71	Q	V		
9+ 0	0.9561	1.72	Q	V		
9+ 5	0.9681	1.74	Q	V		
9+10	0.9801	1.75	Q	V		
9+15	0.9922	1.76	Q	V		
9+20	1.0045	1.77	Q	V		
9+25	1.0168	1.79	Q	V		
9+30	1.0292	1.80	Q	V		
9+35	1.0417	1.82	Q	V		
9+40	1.0543	1.83	Q	V		
9+45	1.0670	1.85	Q	V		
9+50	1.0799	1.86	Q	V		
9+55	1.0928	1.88	Q	V		
10+ 0	1.1058	1.89	Q	V		
10+ 5	1.1190	1.91	Q	V		
10+10	1.1323	1.93	Q	V		
10+15	1.1456	1.94	Q	V		
10+20	1.1591	1.96	Q	V		
10+25	1.1728	1.98	Q	V		
10+30	1.1865	2.00	Q	V		
10+35	1.2004	2.02	Q	V		
10+40	1.2144	2.03	Q	V		
10+45	1.2286	2.05	Q	V		
10+50	1.2428	2.07	Q	V		
10+55	1.2573	2.10	Q	V		
11+ 0	1.2718	2.12	Q	V		
11+ 5	1.2866	2.14	Q	V		
11+10	1.3014	2.16	Q	V		
11+15	1.3165	2.18	Q	V		
11+20	1.3317	2.21	Q	V		
11+25	1.3470	2.23	Q	V		
11+30	1.3626	2.26	Q	V		
11+35	1.3783	2.28	Q	V		
11+40	1.3942	2.31	Q	V		
11+45	1.4103	2.33	Q	V		
11+50	1.4265	2.36	Q	V		
11+55	1.4430	2.39	Q	V		
12+ 0	1.4597	2.42	Q	V		
12+ 5	1.4769	2.49	Q	V		
12+10	1.4959	2.76	Q	V		
12+15	1.5173	3.12	Q	V		
12+20	1.5401	3.31	Q	V		
12+25	1.5634	3.39	Q	V		
12+30	1.5871	3.44	Q	V		
12+35	1.6111	3.49	Q	V		
12+40	1.6354	3.53	Q	V		
12+45	1.6600	3.57	Q	V		
12+50	1.6849	3.62	Q	V		

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12+55	1.7102	3.66	Q	V				
13+ 0	1.7357	3.71	Q	V				
13+ 5	1.7616	3.76	Q	V				
13+10	1.7879	3.82	Q	V				
13+15	1.8147	3.88	Q	V				
13+20	1.8418	3.95	Q	V				
13+25	1.8695	4.02	Q	V				
13+30	1.8977	4.09	Q	V				
13+35	1.9264	4.17	Q	V				
13+40	1.9556	4.25	Q	V				
13+45	1.9854	4.33	Q	V				
13+50	2.0159	4.42	Q	V				
13+55	2.0470	4.52	Q	V				
14+ 0	2.0787	4.61	Q	V				
14+ 5	2.1112	4.72	Q	V				
14+10	2.1443	4.81	Q	V				
14+15	2.1781	4.90	Q	V				
14+20	2.2126	5.01	Q	V				
14+25	2.2481	5.15	Q	V				
14+30	2.2845	5.29	Q	V				
14+35	2.3220	5.45	Q	V				
14+40	2.3606	5.61	Q	V				
14+45	2.4006	5.80	Q	V				
14+50	2.4418	5.99	Q	V				
14+55	2.4846	6.21	Q	V				
15+ 0	2.5291	6.45	Q	V				
15+ 5	2.5754	6.72	Q	V				
15+10	2.6237	7.02	Q	V				
15+15	2.6744	7.36	Q	V				
15+20	2.7277	7.74	Q	V				
15+25	2.7836	8.11	Q	V				
15+30	2.8400	8.19	Q	V				
15+35	2.8965	8.20	Q	V				
15+40	2.9562	8.67	Q	V				
15+45	3.0223	9.61	Q	V				
15+50	3.0993	11.17	Q	V				
15+55	3.1923	13.50	Q	V				
16+ 0	3.3098	17.06	Q	V				
16+ 5	3.4837	25.25	Q	V				
16+10	3.7733	42.05	Q	V				
16+15	4.0956	46.80	Q	V				
16+20	4.2919	28.51	Q	V				
16+25	4.4024	16.04	Q	V				
16+30	4.4775	10.91	Q	V				
16+35	4.5428	9.47	Q	V				
16+40	4.5979	8.00	Q	V				
16+45	4.6476	7.23	Q	V				
16+50	4.6932	6.62	Q	V				
16+55	4.7354	6.13	Q	V				
17+ 0	4.7748	5.72	Q	V				
17+ 5	4.8119	5.38	Q	V				
17+10	4.8471	5.11	Q	V				
17+15	4.8807	4.88	Q	V				
17+20	4.9128	4.67	Q	V				
17+25	4.9436	4.47	Q	V				
17+30	4.9731	4.29	Q	V				
17+35	5.0016	4.13	Q	V				
17+40	5.0290	3.98	Q	V				
17+45	5.0555	3.85	Q	V				
17+50	5.0813	3.74	Q	V				
17+55	5.1064	3.64	Q	V				
18+ 0	5.1308	3.55	Q	V				
18+ 5	5.1544	3.42	Q	V				
18+10	5.1759	3.11	Q	V				
18+15	5.1946	2.71	Q	V				
18+20	5.2118	2.50	Q	V				

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18+25	5.2283	2.39	Q			V
18+30	5.2443	2.33	Q			V
18+35	5.2599	2.27	Q			V
18+40	5.2752	2.22	Q			V
18+45	5.2901	2.17	Q			V
18+50	5.3048	2.13	Q			V
18+55	5.3191	2.08	Q			V
19+ 0	5.3332	2.04	Q			V
19+ 5	5.3470	2.01	Q			V
19+10	5.3606	1.97	Q			V
19+15	5.3739	1.93	Q			V
19+20	5.3870	1.90	Q			V
19+25	5.3999	1.87	Q			V
19+30	5.4126	1.84	Q			V
19+35	5.4250	1.81	Q			V
19+40	5.4373	1.78	Q			V
19+45	5.4494	1.75	Q			V
19+50	5.4613	1.73	Q			V
19+55	5.4730	1.70	Q			V
20+ 0	5.4846	1.68	Q			V
20+ 5	5.4960	1.66	Q			V
20+10	5.5072	1.63	Q			V
20+15	5.5183	1.61	Q			V
20+20	5.5293	1.59	Q			V
20+25	5.5401	1.57	Q			V
20+30	5.5508	1.55	Q			V
20+35	5.5613	1.53	Q			V
20+40	5.5718	1.51	Q			V
20+45	5.5821	1.50	Q			V
20+50	5.5923	1.48	Q			V
20+55	5.6023	1.46	Q			V
21+ 0	5.6123	1.45	Q			V
21+ 5	5.6221	1.43	Q			V
21+10	5.6319	1.41	Q			V
21+15	5.6415	1.40	Q			V
21+20	5.6510	1.38	Q			V
21+25	5.6605	1.37	Q			V
21+30	5.6698	1.36	Q			V
21+35	5.6791	1.34	Q			V
21+40	5.6882	1.33	Q			V
21+45	5.6973	1.32	Q			V
21+50	5.7063	1.30	Q			V
21+55	5.7152	1.29	Q			V
22+ 0	5.7240	1.28	Q			V
22+ 5	5.7328	1.27	Q			V
22+10	5.7414	1.26	Q			V
22+15	5.7500	1.25	Q			V
22+20	5.7585	1.24	Q			V
22+25	5.7670	1.23	Q			V
22+30	5.7753	1.21	Q			V
22+35	5.7836	1.20	Q			V
22+40	5.7918	1.19	Q			V
22+45	5.8000	1.18	Q			V
22+50	5.8081	1.18	Q			V
22+55	5.8161	1.17	Q			V
23+ 0	5.8241	1.16	Q			V
23+ 5	5.8320	1.15	Q			V
23+10	5.8398	1.14	Q			V
23+15	5.8476	1.13	Q			V
23+20	5.8554	1.12	Q			V
23+25	5.8630	1.11	Q			V
23+30	5.8706	1.11	Q			V
23+35	5.8782	1.10	Q			V
23+40	5.8857	1.09	Q			V
23+45	5.8932	1.08	Q			V
23+50	5.9006	1.07	Q			V

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23+55	5.9079	1.07	Q				V
24+ 0	5.9152	1.06	Q				V
24+ 5	5.9221	1.00	Q				V
24+10	5.9269	0.70	Q				V
24+15	5.9288	0.27	Q				V
24+20	5.9293	0.08	Q				V
24+25	5.9295	0.02	Q				V
24+30	5.9295	0.01	Q				V

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Unit Hydrograph Analysis

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Study date 11/14/11 File Name 100288PRB25UH.out

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Orange County Unit Hydrograph Hydrology Method
Manual Date(s) - October 1986, November 1996

Program License Serial Number 4014

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
DEVELOPED CONDITION
AREA B

Storm Event Year = 25

Antecedent Moisture Condition = 2

English (in-lb) Input Units Used
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***** Area-averaged max loss rate, Fm *****

SCS curve No. (AMCII)	Area (Ac.)	Area Fraction	Soil Group	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
71.3	6.3	1.00	D	0.200	0.309	0.062

Area-averaged adjusted loss rate Fm (In/Hr) = 0.062

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC2)	S	Pervious Yield Fr
1.94	0.309	71.3	71.3	4.03	0.392
4.34	0.691	98.0	98.0	0.20	0.947

Area-averaged catchment yield fraction, Y = 0.776

Area-averaged low loss fraction, Yb = 0.224

+++++-----

User entry of time of concentration = 0.160 (hours)

Watershed area = 6.28(Ac.)

Catchment Lag time = 0.128 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 65.1042

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.062(In/Hr)

Average low loss rate fraction (Yb) = 0.224 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.400(In)

Computed peak 30-minute rainfall = 0.870(In)

Specified peak 1-hour rainfall = 1.150(In)

Computed peak 3-hour rainfall = 1.940(In)

Specified peak 6-hour rainfall = 2.710(In)

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Specified peak 24-hour rainfall = 4.490(In)

Rainfall depth area reduction factors:
Using a total area of 6.28(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000	Adjusted rainfall = 0.400(In)
30-minute factor = 1.000	Adjusted rainfall = 0.870(In)
1-hour factor = 1.000	Adjusted rainfall = 1.150(In)
3-hour factor = 1.000	Adjusted rainfall = 1.940(In)
6-hour factor = 1.000	Adjusted rainfall = 2.710(In)
24-hour factor = 1.000	Adjusted rainfall = 4.490(In)

Unit Hydrograph

Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 75.95 (CFS))		
1	7.634	5.798
2	47.879	30.566
3	85.995	28.948
4	97.049	8.395
5	99.073	1.538
6	100.000	0.704

Total soil rain loss = 0.75(In)

Total effective rainfall = 3.74(In)

Peak flow rate in flood hydrograph = 17.42(CFS)

24 - H O U R S T O R M R u n o f f H y d r o g r a p h

Hydrograph in 5 Minute intervals ((CFS))

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	5.0	10.0	15.0	20.0
0+ 5	0.0002	0.03	Q				
0+10	0.0013	0.16	Q				
0+15	0.0033	0.29	Q				
0+20	0.0055	0.33	Q				
0+25	0.0078	0.33	Q				
0+30	0.0102	0.34	Q				
0+35	0.0125	0.34	Q				
0+40	0.0148	0.34	Q				
0+45	0.0172	0.34	Q				
0+50	0.0196	0.34	Q				
0+55	0.0219	0.34	Q				
1+ 0	0.0243	0.35	Q				
1+ 5	0.0267	0.35	Q				
1+10	0.0291	0.35	Q				
1+15	0.0315	0.35	Q				
1+20	0.0339	0.35	Q				
1+25	0.0363	0.35	Q				
1+30	0.0388	0.35	Q				
1+35	0.0412	0.35	Q				
1+40	0.0437	0.36	Q				
1+45	0.0461	0.36	Q				
1+50	0.0486	0.36	Q				
1+55	0.0511	0.36	QV				

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2+ 0	0.0535	0.36 QV
2+ 5	0.0560	0.36 QV
2+10	0.0585	0.36 QV
2+15	0.0611	0.37 QV
2+20	0.0636	0.37 QV
2+25	0.0661	0.37 QV
2+30	0.0687	0.37 QV
2+35	0.0712	0.37 QV
2+40	0.0738	0.37 QV
2+45	0.0763	0.37 QV
2+50	0.0789	0.38 QV
2+55	0.0815	0.38 QV
3+ 0	0.0841	0.38 QV
3+ 5	0.0867	0.38 QV
3+10	0.0894	0.38 QV
3+15	0.0920	0.38 QV
3+20	0.0947	0.38 QV
3+25	0.0973	0.39 QV
3+30	0.1000	0.39 Q V
3+35	0.1027	0.39 Q V
3+40	0.1053	0.39 Q V
3+45	0.1080	0.39 Q V
3+50	0.1108	0.39 Q V
3+55	0.1135	0.40 Q V
4+ 0	0.1162	0.40 Q V
4+ 5	0.1190	0.40 Q V
4+10	0.1217	0.40 Q V
4+15	0.1245	0.40 Q V
4+20	0.1273	0.40 Q V
4+25	0.1301	0.41 Q V
4+30	0.1329	0.41 Q V
4+35	0.1357	0.41 Q V
4+40	0.1386	0.41 Q V
4+45	0.1414	0.41 Q V
4+50	0.1443	0.42 Q V
4+55	0.1472	0.42 Q V
5+ 0	0.1500	0.42 Q V
5+ 5	0.1530	0.42 Q V
5+10	0.1559	0.42 Q V
5+15	0.1588	0.43 Q V
5+20	0.1617	0.43 Q V
5+25	0.1647	0.43 Q V
5+30	0.1677	0.43 Q V
5+35	0.1707	0.43 Q V
5+40	0.1737	0.44 Q V
5+45	0.1767	0.44 Q V
5+50	0.1797	0.44 Q V
5+55	0.1828	0.44 Q V
6+ 0	0.1859	0.45 Q V
6+ 5	0.1889	0.45 Q V
6+10	0.1920	0.45 Q V
6+15	0.1952	0.45 Q V
6+20	0.1983	0.45 Q V
6+25	0.2014	0.46 Q V
6+30	0.2046	0.46 Q V
6+35	0.2078	0.46 Q V
6+40	0.2110	0.46 Q V
6+45	0.2142	0.47 Q V
6+50	0.2174	0.47 Q V
6+55	0.2207	0.47 Q V
7+ 0	0.2240	0.48 Q V
7+ 5	0.2273	0.48 Q V
7+10	0.2306	0.48 Q V
7+15	0.2339	0.48 Q V
7+20	0.2373	0.49 Q V
7+25	0.2406	0.49 Q V

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7+30	0.2440	0.49	Q	V
7+35	0.2475	0.50	Q	V
7+40	0.2509	0.50	Q	V
7+45	0.2543	0.50	Q	V
7+50	0.2578	0.51	Q	V
7+55	0.2613	0.51	Q	V
8+ 0	0.2649	0.51	Q	V
8+ 5	0.2684	0.51	Q	V
8+10	0.2720	0.52	Q	V
8+15	0.2756	0.52	Q	V
8+20	0.2792	0.53	Q	V
8+25	0.2828	0.53	Q	V
8+30	0.2865	0.53	Q	V
8+35	0.2902	0.54	Q	V
8+40	0.2939	0.54	Q	V
8+45	0.2976	0.54	Q	V
8+50	0.3014	0.55	Q	V
8+55	0.3052	0.55	Q	V
9+ 0	0.3090	0.56	Q	V
9+ 5	0.3129	0.56	Q	V
9+10	0.3168	0.56	Q	V
9+15	0.3207	0.57	Q	V
9+20	0.3246	0.57	Q	V
9+25	0.3286	0.58	Q	V
9+30	0.3326	0.58	Q	V
9+35	0.3367	0.59	Q	V
9+40	0.3407	0.59	Q	V
9+45	0.3448	0.60	Q	V
9+50	0.3490	0.60	Q	V
9+55	0.3532	0.61	Q	V
10+ 0	0.3574	0.61	Q	V
10+ 5	0.3616	0.62	Q	V
10+10	0.3659	0.62	Q	V
10+15	0.3702	0.63	Q	V
10+20	0.3746	0.63	Q	V
10+25	0.3790	0.64	Q	V
10+30	0.3834	0.64	Q	V
10+35	0.3879	0.65	Q	V
10+40	0.3924	0.66	Q	V
10+45	0.3970	0.66	Q	V
10+50	0.4016	0.67	Q	V
10+55	0.4063	0.68	Q	V
11+ 0	0.4110	0.68	Q	V
11+ 5	0.4157	0.69	Q	V
11+10	0.4205	0.70	Q	V
11+15	0.4254	0.71	Q	V
11+20	0.4303	0.71	Q	V
11+25	0.4352	0.72	Q	V
11+30	0.4403	0.73	Q	V
11+35	0.4453	0.74	Q	V
11+40	0.4505	0.75	Q	V
11+45	0.4557	0.75	Q	V
11+50	0.4609	0.76	Q	V
11+55	0.4663	0.77	Q	V
12+ 0	0.4716	0.78	Q	V
12+ 5	0.4772	0.81	Q	V
12+10	0.4836	0.93	Q	V
12+15	0.4908	1.04	Q	V
12+20	0.4982	1.08	Q	V
12+25	0.5058	1.10	Q	V
12+30	0.5135	1.11	Q	V
12+35	0.5212	1.13	Q	V
12+40	0.5291	1.14	Q	V
12+45	0.5370	1.15	Q	V
12+50	0.5451	1.17	Q	V
12+55	0.5532	1.18	Q	V

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13+ 0	0.5615	1.20	Q	V				
13+ 5	0.5699	1.22	Q	V				
13+10	0.5784	1.23	Q	V				
13+15	0.5870	1.25	Q	V				
13+20	0.5957	1.27	Q	V				
13+25	0.6046	1.29	Q	V				
13+30	0.6136	1.31	Q	V				
13+35	0.6228	1.33	Q	V				
13+40	0.6322	1.36	Q	V				
13+45	0.6417	1.39	Q	V				
13+50	0.6515	1.42	Q	V				
13+55	0.6615	1.45	Q	V				
14+ 0	0.6717	1.49	Q	V				
14+ 5	0.6822	1.52	Q	V				
14+10	0.6929	1.55	Q	V				
14+15	0.7038	1.59	Q	V				
14+20	0.7150	1.63	Q	V				
14+25	0.7266	1.68	Q	V				
14+30	0.7385	1.73	Q	V				
14+35	0.7508	1.79	Q	V				
14+40	0.7635	1.85	Q	V				
14+45	0.7767	1.91	Q	V				
14+50	0.7904	1.99	Q	V				
14+55	0.8046	2.07	Q	V				
15+ 0	0.8194	2.16	Q	V				
15+ 5	0.8350	2.25	Q	V				
15+10	0.8512	2.36	Q	V				
15+15	0.8684	2.49	Q	V				
15+20	0.8865	2.63	Q	V				
15+25	0.9054	2.75	Q	V				
15+30	0.9243	2.74	Q	V				
15+35	0.9433	2.76	Q	V				
15+40	0.9639	2.99	Q	V				
15+45	0.9871	3.37	Q	V				
15+50	1.0148	4.03	Q	V				
15+55	1.0487	4.92	Q	V				
16+ 0	1.0929	6.41	Q	V				
16+ 5	1.1616	9.98	Q	V				
16+10	1.2815	17.42	Q	V				
16+15	1.3884	15.51	Q	V				
16+20	1.4413	7.69	Q	V				
16+25	1.4707	4.27	Q	V				
16+30	1.4939	3.37	Q	V				
16+35	1.5136	2.85	Q	V				
16+40	1.5312	2.55	Q	V				
16+45	1.5471	2.31	Q	V				
16+50	1.5616	2.11	Q	V				
16+55	1.5750	1.95	Q	V				
17+ 0	1.5875	1.82	Q	V				
17+ 5	1.5992	1.70	Q	V				
17+10	1.6104	1.62	Q	V				
17+15	1.6210	1.54	Q	V				
17+20	1.6311	1.47	Q	V				
17+25	1.6407	1.40	Q	V				
17+30	1.6500	1.34	Q	V				
17+35	1.6589	1.30	Q	V				
17+40	1.6676	1.26	Q	V				
17+45	1.6760	1.22	Q	V				
17+50	1.6842	1.19	Q	V				
17+55	1.6922	1.16	Q	V				
18+ 0	1.7000	1.13	Q	V				
18+ 5	1.7075	1.09	Q	V				
18+10	1.7141	0.96	Q	V				
18+15	1.7198	0.83	Q	V				
18+20	1.7252	0.78	Q	V				
18+25	1.7304	0.76	Q	V				

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18+30	1.7355	0.74	Q						V
18+35	1.7405	0.72	Q						V
18+40	1.7454	0.71	Q						V
18+45	1.7502	0.69	Q						V
18+50	1.7549	0.68	Q						V
18+55	1.7594	0.67	Q						V
19+ 0	1.7639	0.65	Q						V
19+ 5	1.7684	0.64	Q						V
19+10	1.7727	0.63	Q						V
19+15	1.7770	0.62	Q						V
19+20	1.7811	0.61	Q						V
19+25	1.7853	0.60	Q						V
19+30	1.7893	0.59	Q						V
19+35	1.7933	0.58	Q						V
19+40	1.7972	0.57	Q						V
19+45	1.8011	0.56	Q						V
19+50	1.8049	0.55	Q						V
19+55	1.8087	0.55	Q						V
20+ 0	1.8124	0.54	Q						V
20+ 5	1.8160	0.53	Q						V
20+10	1.8196	0.52	Q						V
20+15	1.8232	0.52	Q						V
20+20	1.8267	0.51	Q						V
20+25	1.8301	0.50	Q						V
20+30	1.8336	0.50	Q						V
20+35	1.8370	0.49	Q						V
20+40	1.8403	0.49	Q						V
20+45	1.8436	0.48	Q						V
20+50	1.8469	0.47	Q						V
20+55	1.8501	0.47	Q						V
21+ 0	1.8533	0.46	Q						V
21+ 5	1.8564	0.46	Q						V
21+10	1.8596	0.45	Q						V
21+15	1.8626	0.45	Q						V
21+20	1.8657	0.44	Q						V
21+25	1.8687	0.44	Q						V
21+30	1.8717	0.44	Q						V
21+35	1.8747	0.43	Q						V
21+40	1.8776	0.43	Q						V
21+45	1.8805	0.42	Q						V
21+50	1.8834	0.42	Q						V
21+55	1.8863	0.41	Q						V
22+ 0	1.8891	0.41	Q						V
22+ 5	1.8919	0.41	Q						V
22+10	1.8947	0.40	Q						V
22+15	1.8974	0.40	Q						V
22+20	1.9002	0.40	Q						V
22+25	1.9029	0.39	Q						V
22+30	1.9056	0.39	Q						V
22+35	1.9082	0.39	Q						V
22+40	1.9109	0.38	Q						V
22+45	1.9135	0.38	Q						V
22+50	1.9161	0.38	Q						V
22+55	1.9187	0.37	Q						V
23+ 0	1.9212	0.37	Q						V
23+ 5	1.9237	0.37	Q						V
23+10	1.9263	0.37	Q						V
23+15	1.9288	0.36	Q						V
23+20	1.9312	0.36	Q						V
23+25	1.9337	0.36	Q						V
23+30	1.9362	0.35	Q						V
23+35	1.9386	0.35	Q						V
23+40	1.9410	0.35	Q						V
23+45	1.9434	0.35	Q						V
23+50	1.9458	0.34	Q						V
23+55	1.9481	0.34	Q						V

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24+ 0	1.9505	0.34	Q				V
24+ 5	1.9526	0.31	Q				V
24+10	1.9538	0.18	Q				V
24+15	1.9541	0.05	Q				V
24+20	1.9542	0.01	Q				V
24+25	1.9542	0.00	Q				V

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Unit Hydrograph Analysis

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Study date 11/14/11 File Name 100288PRA100UH.out

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Orange County Unit Hydrograph Hydrology Method
Manual Date(s) - October 1986, November 1996

Program License Serial Number 4014

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
DEVELOPED CONDITION
AREA A

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

+++++
***** Area-averaged max loss rate, Fm *****

SCS curve No. (AMCII)	Area (Ac.)	Area Fraction	Soil Group	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
73.8	17.7	1.00	D	0.200	0.183	0.037

Area-averaged adjusted loss rate Fm (In/Hr) = 0.037

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
3.25	0.183	73.8	90.0	1.11	0.798
14.49	0.817	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.928

Area-averaged low loss fraction, Yb = 0.072

+++++
User entry of time of concentration = 0.193 (hours)

Watershed area = 17.74(Ac.)

Catchment Lag time = 0.154 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 54.0564

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.037(In/Hr)

Average low loss rate fraction (Yb) = 0.072 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.520(In)

Computed peak 30-minute rainfall = 1.090(In)

Specified peak 1-hour rainfall = 1.450(In)

Computed peak 3-hour rainfall = 2.430(In)

Specified peak 6-hour rainfall = 3.360(In)

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 Specified peak 24-hour rainfall = 5.630(In)

Rainfall depth area reduction factors:
 Using a total area of 17.74(Ac.) (Ref: fig. E-4)

5-minute factor = 0.999	Adjusted rainfall = 0.520(In)
30-minute factor = 0.999	Adjusted rainfall = 1.089(In)
1-hour factor = 0.999	Adjusted rainfall = 1.449(In)
3-hour factor = 1.000	Adjusted rainfall = 2.430(In)
6-hour factor = 1.000	Adjusted rainfall = 3.360(In)
24-hour factor = 1.000	Adjusted rainfall = 5.630(In)

Unit Hydrograph		
Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
(K = 214.54 (CFS))		
1	5.321	11.416
2	34.437	62.466
3	74.878	86.763
4	92.713	38.265
5	97.954	11.243
6	99.152	2.570
7	100.000	1.820

Total soil rain loss = 0.33(In)
 Total effective rainfall = 5.30(In)
 Peak flow rate in flood hydrograph = 60.07(CFS)

24 - H O U R S T O R M		
Run off Hydrograph		
Hydrograph in 5 Minute intervals ((CFS))		
Time(h+m)	Volume Ac.Ft	Q(CFS)
0		0
17.5		35.0
35.0		52.5
52.5		70.0

0+ 5	0.0005	0.08 Q				
0+10	0.0040	0.50 Q				
0+15	0.0115	1.09 Q				
0+20	0.0208	1.35 Q				
0+25	0.0306	1.43 Q				
0+30	0.0406	1.45 Q				
0+35	0.0508	1.47 Q				
0+40	0.0609	1.48 Q				
0+45	0.0711	1.48 Q				
0+50	0.0813	1.49 Q				
0+55	0.0916	1.49 Q				
1+ 0	0.1019	1.50 Q				
1+ 5	0.1122	1.50 Q				
1+10	0.1226	1.51 Q				
1+15	0.1330	1.51 Q				
1+20	0.1435	1.52 Q				
1+25	0.1539	1.52 Q				
1+30	0.1645	1.53 Q				
1+35	0.1750	1.53 Q				
1+40	0.1856	1.54 Q				
1+45	0.1962	1.54 QV				
1+50	0.2069	1.55 QV				

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1+55	0.2176	1.55	QV
2+ 0	0.2284	1.56	QV
2+ 5	0.2391	1.57	QV
2+10	0.2500	1.57	QV
2+15	0.2608	1.58	QV
2+20	0.2717	1.58	QV
2+25	0.2827	1.59	QV
2+30	0.2937	1.60	QV
2+35	0.3047	1.60	QV
2+40	0.3158	1.61	QV
2+45	0.3269	1.61	QV
2+50	0.3381	1.62	QV
2+55	0.3493	1.63	QV
3+ 0	0.3605	1.63	QV
3+ 5	0.3718	1.64	QV
3+10	0.3832	1.65	QV
3+15	0.3946	1.65	Q V
3+20	0.4060	1.66	Q V
3+25	0.4175	1.67	Q V
3+30	0.4290	1.67	Q V
3+35	0.4406	1.68	Q V
3+40	0.4522	1.69	Q V
3+45	0.4639	1.69	Q V
3+50	0.4756	1.70	Q V
3+55	0.4873	1.71	Q V
4+ 0	0.4992	1.72	Q V
4+ 5	0.5110	1.72	Q V
4+10	0.5230	1.73	Q V
4+15	0.5349	1.74	Q V
4+20	0.5470	1.75	Q V
4+25	0.5590	1.75	QV
4+30	0.5712	1.76	QV
4+35	0.5834	1.77	QV
4+40	0.5956	1.78	Q V
4+45	0.6079	1.79	Q V
4+50	0.6202	1.79	Q V
4+55	0.6327	1.80	Q V
5+ 0	0.6451	1.81	Q V
5+ 5	0.6577	1.82	Q V
5+10	0.6702	1.83	Q V
5+15	0.6829	1.84	Q V
5+20	0.6956	1.85	Q V
5+25	0.7084	1.85	Q V
5+30	0.7212	1.86	Q V
5+35	0.7341	1.87	Q V
5+40	0.7470	1.88	Q V
5+45	0.7601	1.89	Q V
5+50	0.7732	1.90	Q V
5+55	0.7863	1.91	Q V
6+ 0	0.7995	1.92	Q V
6+ 5	0.8128	1.93	Q V
6+10	0.8262	1.94	Q V
6+15	0.8396	1.95	Q V
6+20	0.8531	1.96	Q V
6+25	0.8667	1.97	Q V
6+30	0.8803	1.98	Q V
6+35	0.8940	1.99	Q V
6+40	0.9078	2.00	Q V
6+45	0.9217	2.01	Q V
6+50	0.9356	2.02	Q V
6+55	0.9497	2.04	Q V
7+ 0	0.9638	2.05	Q V
7+ 5	0.9779	2.06	Q V
7+10	0.9922	2.07	Q V
7+15	1.0066	2.08	Q V
7+20	1.0210	2.10	Q V

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7+25	1.0355	2.11	Q	V		
7+30	1.0501	2.12	Q	V		
7+35	1.0648	2.13	Q	V		
7+40	1.0796	2.15	Q	V		
7+45	1.0945	2.16	Q	V		
7+50	1.1094	2.17	Q	V		
7+55	1.1245	2.19	Q	V		
8+ 0	1.1396	2.20	Q	V		
8+ 5	1.1549	2.21	Q	V		
8+10	1.1702	2.23	Q	V		
8+15	1.1857	2.24	Q	V		
8+20	1.2012	2.26	Q	V		
8+25	1.2169	2.27	Q	V		
8+30	1.2327	2.29	Q	V		
8+35	1.2485	2.30	Q	V		
8+40	1.2645	2.32	Q	V		
8+45	1.2806	2.34	Q	V		
8+50	1.2968	2.35	Q	V		
8+55	1.3131	2.37	Q	V		
9+ 0	1.3296	2.39	Q	V		
9+ 5	1.3461	2.40	Q	V		
9+10	1.3628	2.42	Q	V		
9+15	1.3796	2.44	Q	V		
9+20	1.3965	2.46	Q	V		
9+25	1.4136	2.48	Q	V		
9+30	1.4308	2.50	Q	V		
9+35	1.4481	2.52	Q	V		
9+40	1.4656	2.54	Q	V		
9+45	1.4832	2.56	Q	V		
9+50	1.5009	2.58	Q	V		
9+55	1.5188	2.60	Q	V		
10+ 0	1.5369	2.62	Q	V		
10+ 5	1.5551	2.64	Q	V		
10+10	1.5735	2.67	Q	V		
10+15	1.5920	2.69	Q	V		
10+20	1.6107	2.71	Q	V		
10+25	1.6295	2.74	Q	V		
10+30	1.6485	2.76	Q	V		
10+35	1.6677	2.79	Q	V		
10+40	1.6871	2.81	Q	V		
10+45	1.7067	2.84	Q	V		
10+50	1.7264	2.87	Q	V		
10+55	1.7464	2.90	Q	V		
11+ 0	1.7665	2.92	Q	V		
11+ 5	1.7868	2.95	Q	V		
11+10	1.8074	2.98	Q	V		
11+15	1.8282	3.02	Q	V		
11+20	1.8492	3.05	Q	V		
11+25	1.8704	3.08	Q	V		
11+30	1.8918	3.11	Q	V		
11+35	1.9135	3.15	Q	V		
11+40	1.9355	3.19	Q	V		
11+45	1.9577	3.22	Q	V		
11+50	1.9801	3.26	Q	V		
11+55	2.0029	3.30	Q	V		
12+ 0	2.0259	3.34	Q	V		
12+ 5	2.0495	3.43	Q	V		
12+10	2.0752	3.73	Q	V		
12+15	2.1037	4.14	Q	V		
12+20	2.1336	4.34	Q	V		
12+25	2.1642	4.44	Q	V		
12+30	2.1952	4.50	Q	V		
12+35	2.2266	4.57	Q	V		
12+40	2.2585	4.62	Q	V		
12+45	2.2907	4.68	Q	V		
12+50	2.3233	4.74	Q	V		

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12+55	2.3564	4.80	Q	V				
13+ 0	2.3900	4.87	Q	V				
13+ 5	2.4240	4.94	Q	V				
13+10	2.4585	5.01	Q	V				
13+15	2.4935	5.08	Q	V				
13+20	2.5290	5.16	Q	V				
13+25	2.5651	5.24	Q	V				
13+30	2.6018	5.33	Q	V				
13+35	2.6391	5.42	Q	V				
13+40	2.6770	5.51	Q	V				
13+45	2.7157	5.61	Q	V				
13+50	2.7550	5.71	Q	V				
13+55	2.7950	5.82	Q	V				
14+ 0	2.8359	5.93	Q	V				
14+ 5	2.8776	6.06	Q	V				
14+10	2.9203	6.20	Q	V				
14+15	2.9641	6.35	Q	V				
14+20	3.0089	6.51	Q	V				
14+25	3.0548	6.67	Q	V				
14+30	3.1018	6.83	Q	V				
14+35	3.1502	7.02	Q	V				
14+40	3.1998	7.21	Q	V				
14+45	3.2510	7.43	Q	V				
14+50	3.3037	7.66	Q	V				
14+55	3.3582	7.91	Q	V				
15+ 0	3.4146	8.19	Q	V				
15+ 5	3.4733	8.52	Q	V				
15+10	3.5345	8.88	Q	V				
15+15	3.5986	9.31	Q	V				
15+20	3.6660	9.79	Q	V				
15+25	3.7368	10.28	Q	V				
15+30	3.8090	10.48	Q	V				
15+35	3.8824	10.65	Q	V				
15+40	3.9605	11.34	Q	V				
15+45	4.0465	12.49	Q	V				
15+50	4.1440	14.15	Q	V				
15+55	4.2584	16.62	Q	V				
16+ 0	4.4025	20.92	Q	V				
16+ 5	4.6198	31.55	Q	V				
16+10	4.9922	54.07	Q	V				
16+15	5.4059	60.07	Q	V				
16+20	5.6519	35.71	Q	V				
16+25	5.7910	20.20	Q	V				
16+30	5.8866	13.88	Q	V				
16+35	5.9691	11.98	Q	V				
16+40	6.0386	10.09	Q	V				
16+45	6.1015	9.13	Q	V				
16+50	6.1592	8.38	Q	V				
16+55	6.2129	7.80	Q	V				
17+ 0	6.2633	7.32	Q	V				
17+ 5	6.3110	6.92	Q	V				
17+10	6.3563	6.57	Q	V				
17+15	6.3994	6.26	Q	V				
17+20	6.4407	5.99	Q	V				
17+25	6.4803	5.76	Q	V				
17+30	6.5186	5.55	Q	V				
17+35	6.5555	5.37	Q	V				
17+40	6.5913	5.20	Q	V				
17+45	6.6260	5.04	Q	V				
17+50	6.6598	4.90	Q	V				
17+55	6.6926	4.77	Q	V				
18+ 0	6.7246	4.65	Q	V				
18+ 5	6.7555	4.49	Q	V				
18+10	6.7839	4.12	Q	V				
18+15	6.8092	3.67	Q	V				
18+20	6.8328	3.42	Q	V				

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18+25	6.8555	3.30	Q			V
18+30	6.8776	3.21	Q			V
18+35	6.8991	3.13	Q			V
18+40	6.9202	3.06	Q			V
18+45	6.9409	3.00	Q			V
18+50	6.9611	2.94	Q			V
18+55	6.9809	2.88	Q			V
19+ 0	7.0004	2.82	Q			V
19+ 5	7.0195	2.77	Q			V
19+10	7.0382	2.72	Q			V
19+15	7.0566	2.67	Q			V
19+20	7.0747	2.63	Q			V
19+25	7.0926	2.59	Q			V
19+30	7.1101	2.54	Q			V
19+35	7.1273	2.50	Q			V
19+40	7.1443	2.47	Q			V
19+45	7.1610	2.43	Q			V
19+50	7.1775	2.39	Q			V
19+55	7.1938	2.36	Q			V
20+ 0	7.2098	2.33	Q			V
20+ 5	7.2256	2.29	Q			V
20+10	7.2412	2.26	Q			V
20+15	7.2566	2.23	Q			V
20+20	7.2718	2.21	Q			V
20+25	7.2868	2.18	Q			V
20+30	7.3016	2.15	Q			V
20+35	7.3162	2.13	Q			V
20+40	7.3307	2.10	Q			V
20+45	7.3450	2.08	Q			V
20+50	7.3591	2.05	Q			V
20+55	7.3731	2.03	Q			V
21+ 0	7.3869	2.01	Q			V
21+ 5	7.4006	1.99	Q			V
21+10	7.4141	1.96	Q			V
21+15	7.4275	1.94	Q			V
21+20	7.4408	1.92	Q			V
21+25	7.4539	1.90	Q			V
21+30	7.4669	1.89	Q			V
21+35	7.4797	1.87	Q			V
21+40	7.4924	1.85	Q			V
21+45	7.5051	1.83	Q			V
21+50	7.5175	1.81	Q			V
21+55	7.5299	1.80	Q			V
22+ 0	7.5422	1.78	Q			V
22+ 5	7.5543	1.76	Q			V
22+10	7.5664	1.75	Q			V
22+15	7.5783	1.73	Q			V
22+20	7.5902	1.72	Q			V
22+25	7.6019	1.70	Q			V
22+30	7.6135	1.69	Q			V
22+35	7.6251	1.68	Q			V
22+40	7.6365	1.66	Q			V
22+45	7.6479	1.65	Q			V
22+50	7.6592	1.64	Q			V
22+55	7.6703	1.62	Q			V
23+ 0	7.6814	1.61	Q			V
23+ 5	7.6924	1.60	Q			V
23+10	7.7034	1.59	Q			V
23+15	7.7142	1.57	Q			V
23+20	7.7250	1.56	Q			V
23+25	7.7357	1.55	Q			V
23+30	7.7463	1.54	Q			V
23+35	7.7568	1.53	Q			V
23+40	7.7672	1.52	Q			V
23+45	7.7776	1.51	Q			V
23+50	7.7879	1.50	Q			V

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23+55	7.7982	1.49	Q				V
24+ 0	7.8084	1.48	Q				V
24+ 5	7.8179	1.39	Q				V
24+10	7.8245	0.96	Q				V
24+15	7.8271	0.37	Q				V
24+20	7.8278	0.11	Q				V
24+25	7.8280	0.03	Q				V
24+30	7.8281	0.01	Q				V

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Unit Hydrograph Analysis

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Study date 11/14/11 File Name 100288PRB100UH.out

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Orange County Unit Hydrograph Hydrology Method
Manual Date(s) - October 1986, November 1996

Program License Serial Number 4014

UPTOWN NEWPORT
HFI JOB NO. II.100288.0000
DEVELOPED CONDITION
AREA B

Storm Event Year = 100

Antecedent Moisture Condition = 3

English (in-lb) Input Units Used

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***** Area-averaged max loss rate, Fm *****

SCS curve No. (AMCII)	Area (Ac.)	Area Fraction	Soil Group	Fp (In/Hr)	Ap (dec.)	Fm (In/Hr)
71.3	6.3	1.00	D	0.200	0.309	0.062

Area-averaged adjusted loss rate Fm (In/Hr) = 0.062

***** Area-Averaged low loss rate fraction, Yb *****

Area (Ac.)	Area Fract	SCS CN (AMC2)	SCS CN (AMC3)	S	Pervious Yield Fr
1.94	0.309	71.3	88.0	1.36	0.759
4.34	0.691	98.0	98.0	0.20	0.958

Area-averaged catchment yield fraction, Y = 0.896

Area-averaged low loss fraction, Yb = 0.104

+++++-----

User entry of time of concentration = 0.159 (hours)

Watershed area = 6.28(Ac.)

Catchment Lag time = 0.127 hours

Unit interval = 5.000 minutes

Unit interval percentage of lag time = 65.5549

Hydrograph baseflow = 0.00(CFS)

Average maximum watershed loss rate(Fm) = 0.062(In/Hr)

Average low loss rate fraction (Yb) = 0.104 (decimal)

VALLEY DEVELOPED S-Graph Selected

Computed peak 5-minute rainfall = 0.520(In)

Computed peak 30-minute rainfall = 1.090(In)

Specified peak 1-hour rainfall = 1.450(In)

Computed peak 3-hour rainfall = 2.430(In)

Specified peak 6-hour rainfall = 3.360(In)

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 Specified peak 24-hour rainfall = 5.630(In)

Rainfall depth area reduction factors:
 Using a total area of 6.28(Ac.) (Ref: fig. E-4)

5-minute factor = 1.000	Adjusted rainfall = 0.520(In)
30-minute factor = 1.000	Adjusted rainfall = 1.090(In)
1-hour factor = 1.000	Adjusted rainfall = 1.450(In)
3-hour factor = 1.000	Adjusted rainfall = 2.430(In)
6-hour factor = 1.000	Adjusted rainfall = 3.360(In)
24-hour factor = 1.000	Adjusted rainfall = 5.630(In)

Unit Hydrograph		
Interval Number	'S' Graph Mean values	Unit Hydrograph ((CFS))
	(K = 75.95 (CFS))	
1	7.736	5.876
2	48.415	30.895
3	86.327	28.794
4	97.147	8.218
5	99.110	1.491
6	100.000	0.676

Total soil rain loss = 0.49(In)
 Total effective rainfall = 5.14(In)
 Peak flow rate in flood hydrograph = 22.46(CFS)

24 - H O U R S T O R M		
Run off Hydrograph		
Hydrograph in 5 Minute intervals ((CFS))		

Time(h+m)	Volume Ac.Ft	Q(CFS)	0	7.5	15.0	22.5	30.0
0+ 5	0.0003	0.04	Q				
0+10	0.0019	0.24	Q				
0+15	0.0049	0.43	Q				
0+20	0.0082	0.48	Q				
0+25	0.0116	0.50	Q				
0+30	0.0151	0.50	Q				
0+35	0.0185	0.50	Q				
0+40	0.0220	0.50	Q				
0+45	0.0255	0.51	Q				
0+50	0.0290	0.51	Q				
0+55	0.0325	0.51	Q				
1+ 0	0.0360	0.51	Q				
1+ 5	0.0396	0.51	Q				
1+10	0.0431	0.52	Q				
1+15	0.0467	0.52	Q				
1+20	0.0503	0.52	Q				
1+25	0.0538	0.52	Q				
1+30	0.0574	0.52	Q				
1+35	0.0611	0.52	Q				
1+40	0.0647	0.53	Q				
1+45	0.0683	0.53	QV				
1+50	0.0720	0.53	QV				
1+55	0.0756	0.53	QV				

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2+ 0	0.0793	0.53	QV
2+ 5	0.0830	0.54	QV
2+10	0.0867	0.54	QV
2+15	0.0904	0.54	QV
2+20	0.0942	0.54	QV
2+25	0.0979	0.54	QV
2+30	0.1017	0.55	QV
2+35	0.1054	0.55	QV
2+40	0.1092	0.55	QV
2+45	0.1130	0.55	QV
2+50	0.1169	0.55	QV
2+55	0.1207	0.56	QV
3+ 0	0.1245	0.56	QV
3+ 5	0.1284	0.56	QV
3+10	0.1323	0.56	QV
3+15	0.1362	0.57	Q V
3+20	0.1401	0.57	Q V
3+25	0.1440	0.57	Q V
3+30	0.1480	0.57	Q V
3+35	0.1519	0.58	Q V
3+40	0.1559	0.58	Q V
3+45	0.1599	0.58	Q V
3+50	0.1639	0.58	Q V
3+55	0.1679	0.58	Q V
4+ 0	0.1720	0.59	Q V
4+ 5	0.1761	0.59	Q V
4+10	0.1801	0.59	Q V
4+15	0.1842	0.60	Q V
4+20	0.1883	0.60	Q V
4+25	0.1925	0.60	Q V
4+30	0.1966	0.60	Q V
4+35	0.2008	0.61	Q V
4+40	0.2050	0.61	Q V
4+45	0.2092	0.61	Q V
4+50	0.2134	0.61	Q V
4+55	0.2177	0.62	Q V
5+ 0	0.2220	0.62	Q V
5+ 5	0.2262	0.62	Q V
5+10	0.2306	0.63	Q V
5+15	0.2349	0.63	Q V
5+20	0.2392	0.63	Q V
5+25	0.2436	0.63	Q V
5+30	0.2480	0.64	Q V
5+35	0.2524	0.64	Q V
5+40	0.2568	0.64	Q V
5+45	0.2613	0.65	Q V
5+50	0.2658	0.65	Q V
5+55	0.2703	0.65	Q V
6+ 0	0.2748	0.66	Q V
6+ 5	0.2794	0.66	Q V
6+10	0.2839	0.66	Q V
6+15	0.2885	0.67	Q V
6+20	0.2932	0.67	Q V
6+25	0.2978	0.67	Q V
6+30	0.3025	0.68	Q V
6+35	0.3072	0.68	Q V
6+40	0.3119	0.69	Q V
6+45	0.3166	0.69	Q V
6+50	0.3214	0.69	Q V
6+55	0.3262	0.70	Q V
7+ 0	0.3311	0.70	Q V
7+ 5	0.3359	0.71	Q V
7+10	0.3408	0.71	Q V
7+15	0.3457	0.71	Q V
7+20	0.3506	0.72	Q V
7+25	0.3556	0.72	Q V

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7+30	0.3606	0.73	Q	V
7+35	0.3657	0.73	Q	V
7+40	0.3707	0.74	Q	V
7+45	0.3758	0.74	Q	V
7+50	0.3809	0.74	Q	V
7+55	0.3861	0.75	Q	V
8+ 0	0.3913	0.75	Q	V
8+ 5	0.3965	0.76	Q	V
8+10	0.4018	0.76	Q	V
8+15	0.4071	0.77	Q	V
8+20	0.4124	0.77	Q	V
8+25	0.4178	0.78	Q	V
8+30	0.4232	0.78	Q	V
8+35	0.4286	0.79	Q	V
8+40	0.4341	0.79	Q	V
8+45	0.4396	0.80	Q	V
8+50	0.4451	0.81	Q	V
8+55	0.4507	0.81	Q	V
9+ 0	0.4564	0.82	Q	V
9+ 5	0.4620	0.82	Q	V
9+10	0.4677	0.83	Q	V
9+15	0.4735	0.84	Q	V
9+20	0.4793	0.84	Q	V
9+25	0.4851	0.85	Q	V
9+30	0.4910	0.86	Q	V
9+35	0.4970	0.86	Q	V
9+40	0.5030	0.87	Q	V
9+45	0.5090	0.88	Q	V
9+50	0.5151	0.88	Q	V
9+55	0.5212	0.89	Q	V
10+ 0	0.5274	0.90	Q	V
10+ 5	0.5336	0.91	Q	V
10+10	0.5399	0.91	Q	V
10+15	0.5463	0.92	Q	V
10+20	0.5527	0.93	Q	V
10+25	0.5591	0.94	Q	V
10+30	0.5657	0.95	Q	V
10+35	0.5723	0.96	Q	V
10+40	0.5789	0.96	Q	V
10+45	0.5856	0.97	Q	V
10+50	0.5924	0.98	Q	V
10+55	0.5992	0.99	Q	V
11+ 0	0.6061	1.00	Q	V
11+ 5	0.6131	1.01	Q	V
11+10	0.6202	1.02	Q	V
11+15	0.6273	1.03	Q	V
11+20	0.6345	1.05	Q	V
11+25	0.6418	1.06	Q	V
11+30	0.6491	1.07	Q	V
11+35	0.6566	1.08	Q	V
11+40	0.6641	1.09	Q	V
11+45	0.6717	1.11	Q	V
11+50	0.6794	1.12	Q	V
11+55	0.6872	1.13	Q	V
12+ 0	0.6951	1.15	Q	V
12+ 5	0.7033	1.18	Q	V
12+10	0.7124	1.32	Q	V
12+15	0.7224	1.45	Q	V
12+20	0.7328	1.50	Q	V
12+25	0.7433	1.53	Q	V
12+30	0.7539	1.55	Q	V
12+35	0.7647	1.57	Q	V
12+40	0.7756	1.59	Q	V
12+45	0.7867	1.61	Q	V
12+50	0.7979	1.63	Q	V
12+55	0.8093	1.65	Q	V

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13+ 0	0.8208	1.67	Q	V
13+ 5	0.8325	1.70	Q	V
13+10	0.8443	1.72	Q	V
13+15	0.8563	1.75	Q	V
13+20	0.8686	1.77	Q	V
13+25	0.8810	1.80	Q	V
13+30	0.8936	1.83	Q	V
13+35	0.9064	1.86	Q	V
13+40	0.9194	1.89	Q	V
13+45	0.9327	1.93	Q	V
13+50	0.9462	1.96	Q	V
13+55	0.9600	2.00	Q	V
14+ 0	0.9741	2.04	Q	V
14+ 5	0.9884	2.08	Q	V
14+10	1.0031	2.14	Q	V
14+15	1.0182	2.19	Q	V
14+20	1.0336	2.24	Q	V
14+25	1.0494	2.29	Q	V
14+30	1.0656	2.35	Q	V
14+35	1.0823	2.42	Q	V
14+40	1.0994	2.49	Q	V
14+45	1.1171	2.56	Q	V
14+50	1.1353	2.64	Q	V
14+55	1.1541	2.73	Q	V
15+ 0	1.1736	2.83	Q	V
15+ 5	1.1939	2.94	Q	V
15+10	1.2150	3.07	Q	V
15+15	1.2371	3.21	Q	V
15+20	1.2603	3.38	Q	V
15+25	1.2847	3.53	Q	V
15+30	1.3092	3.56	Q	V
15+35	1.3343	3.65	Q	V
15+40	1.3616	3.96	Q	V
15+45	1.3920	4.41	Q	V
15+50	1.4270	5.08	Q	V
15+55	1.4686	6.04	Q	V
16+ 0	1.5228	7.87	Q	V
16+ 5	1.6090	12.51	Q	V
16+10	1.7637	22.46	Q	V
16+15	1.9004	19.85	Q	V
16+20	1.9675	9.74	Q	V
16+25	2.0053	5.50	Q	V
16+30	2.0353	4.35	Q	V
16+35	2.0605	3.66	Q	V
16+40	2.0831	3.29	Q	V
16+45	2.1038	3.00	Q	V
16+50	2.1229	2.78	Q	V
16+55	2.1408	2.60	Q	V
17+ 0	2.1577	2.45	Q	V
17+ 5	2.1737	2.32	Q	V
17+10	2.1888	2.20	Q	V
17+15	2.2033	2.10	Q	V
17+20	2.2172	2.02	Q	V
17+25	2.2306	1.94	Q	V
17+30	2.2435	1.87	Q	V
17+35	2.2560	1.81	Q	V
17+40	2.2681	1.76	Q	V
17+45	2.2798	1.71	Q	V
17+50	2.2913	1.66	Q	V
17+55	2.3024	1.61	Q	V
18+ 0	2.3132	1.57	Q	V
18+ 5	2.3236	1.51	Q	V
18+10	2.3330	1.36	Q	V
18+15	2.3413	1.21	Q	V
18+20	2.3492	1.15	Q	V
18+25	2.3569	1.11	Q	V

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18+30	2.3643	1.09	Q			V
18+35	2.3717	1.06	Q			V
18+40	2.3788	1.04	Q			V
18+45	2.3858	1.02	Q			V
18+50	2.3927	1.00	Q			V
18+55	2.3994	0.98	Q			V
19+ 0	2.4060	0.96	Q			V
19+ 5	2.4125	0.94	Q			V
19+10	2.4189	0.92	Q			V
19+15	2.4251	0.91	Q			V
19+20	2.4313	0.89	Q			V
19+25	2.4373	0.88	Q			V
19+30	2.4433	0.86	Q			V
19+35	2.4491	0.85	Q			V
19+40	2.4549	0.84	Q			V
19+45	2.4606	0.83	Q			V
19+50	2.4662	0.81	Q			V
19+55	2.4717	0.80	Q			V
20+ 0	2.4772	0.79	Q			V
20+ 5	2.4826	0.78	Q			V
20+10	2.4879	0.77	Q			V
20+15	2.4931	0.76	Q			V
20+20	2.4983	0.75	Q			V
20+25	2.5034	0.74	Q			V
20+30	2.5084	0.73	Q			V
20+35	2.5134	0.72	Q			V
20+40	2.5183	0.71	Q			V
20+45	2.5232	0.71	Q			V
20+50	2.5280	0.70	Q			V
20+55	2.5328	0.69	Q			V
21+ 0	2.5375	0.68	Q			V
21+ 5	2.5421	0.68	Q			V
21+10	2.5467	0.67	Q			V
21+15	2.5513	0.66	Q			V
21+20	2.5558	0.66	Q			V
21+25	2.5603	0.65	Q			V
21+30	2.5647	0.64	Q			V
21+35	2.5691	0.64	Q			V
21+40	2.5734	0.63	Q			V
21+45	2.5777	0.62	Q			V
21+50	2.5820	0.62	Q			V
21+55	2.5862	0.61	Q			V
22+ 0	2.5904	0.61	Q			V
22+ 5	2.5945	0.60	Q			V
22+10	2.5986	0.60	Q			V
22+15	2.6027	0.59	Q			V
22+20	2.6067	0.59	Q			V
22+25	2.6107	0.58	Q			V
22+30	2.6147	0.58	Q			V
22+35	2.6186	0.57	Q			V
22+40	2.6225	0.57	Q			V
22+45	2.6264	0.56	Q			V
22+50	2.6302	0.56	Q			V
22+55	2.6340	0.55	Q			V
23+ 0	2.6378	0.55	Q			V
23+ 5	2.6416	0.54	Q			V
23+10	2.6453	0.54	Q			V
23+15	2.6490	0.54	Q			V
23+20	2.6527	0.53	Q			V
23+25	2.6563	0.53	Q			V
23+30	2.6599	0.53	Q			V
23+35	2.6635	0.52	Q			V
23+40	2.6671	0.52	Q			V
23+45	2.6706	0.51	Q			V
23+50	2.6741	0.51	Q			V
23+55	2.6776	0.51	Q			V

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24+ 0	2.6811	0.50	Q				V
24+ 5	2.6843	0.46	Q				V
24+10	2.6860	0.26	Q				V
24+15	2.6865	0.07	Q				V
24+20	2.6866	0.01	Q				V
24+25	2.6866	0.00	Q				V
